NBG-460N

Wireless N Gigabit Router

User's Guide

Version 3.60
3/2008
Edition 1

DEFAULT LOGIN	
IP Address	**http://192.168.1.1**
Password	**1234**

ZyXEL

www.zyxel.com

About This User's Guide

Intended Audience

This manual is intended for people who want to configure the NBG-460N using the web configurator. You should have at least a basic knowledge of TCP/IP networking concepts and topology.

Related Documentation

- Quick Start Guide

  The Quick Start Guide is designed to help you get up and running right away. It contains information on setting up your network and configuring for Internet access.
- Supporting Disk

  Refer to the included CD for support documents.
- ZyXEL Web Site

  Please refer to www.zyxel.com for additional support documentation and product certifications.

User Guide Feedback

Help us help you. Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

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Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this User’s Guide.

Warnings tell you about things that could harm you or your device.

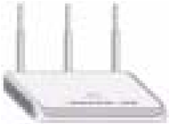
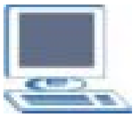
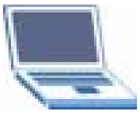
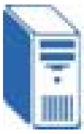
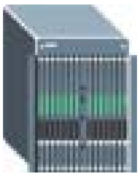
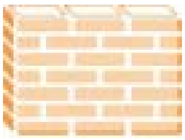
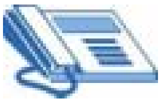
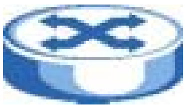
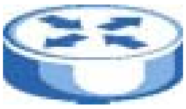
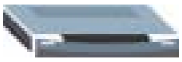
Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

Syntax Conventions

- The NBG-460N may be referred to as the “NBG-460N”, the “device”, the “product” or the “system” in this User’s Guide.
- Product labels, screen names, field labels and field choices are all in **bold** font.
- A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the “enter” or “return” key on your keyboard.
- “Enter” means for you to type one or more characters and then press the [ENTER] key. “Select” or “choose” means for you to use one of the predefined choices.
- A right angle bracket (>) within a screen name denotes a mouse click. For example, **Maintenance > Log > Log Setting** means you first click **Maintenance** in the navigation panel, then the **Log** sub menu and finally the **Log Setting** tab to get to that screen.
- Units of measurement may denote the “metric” value or the “scientific” value. For example, “k” for kilo may denote “1000” or “1024”, “M” for mega may denote “1000000” or “1048576” and so on.
- “e.g.,” is a shorthand for “for instance”, and “i.e.,” means “that is” or “in other words”.

Icons Used in Figures

Figures in this User's Guide may use the following generic icons. The NBG-460N icon is not an exact representation of your device.

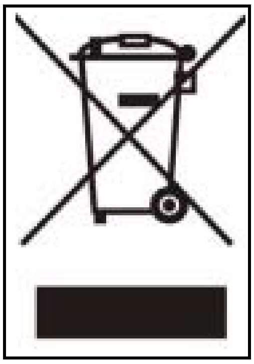
NBG-460N 	Computer 	Notebook computer 
Server 	DSLAM 	Firewall 
Telephone 	Switch 	Router 
Modem 		

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- Do NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel should service or disassemble this device. Please contact your vendor for further information.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Use ONLY an appropriate power adaptor or cord for your device.
- Connect the power adaptor or cord to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe).
- Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution.
- If the power adaptor or cord is damaged, remove it from the power outlet.
- Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Antenna Warning! This device meets ETSI and FCC certification requirements when using the included antenna(s). Only use the included antenna(s).
- If you wall mount your device, make sure that no electrical lines, gas or water pipes will be damaged.

This product is recyclable. Dispose of it properly.



Contents Overview

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PART I
Introduction

Getting to Know Your NBG-460N

This chapter introduces the main features and applications of the NBG-460N.

1.1 Overview

The NBG-460N acts as either an access point (AP) or a secure broadband router for all data passing between the Internet and your local network. In both **AP** and **Router Mode** you can set up a wireless network with other IEEE 802.11b/g/n compatible devices. In **Router Mode** a number of services such as a firewall, IPSec VPN and content filtering are also available. You can use media bandwidth management to efficiently manage traffic on your network. Bandwidth management features allow you to prioritize time-sensitive or highly important applications such as Voice over the Internet (VoIP).

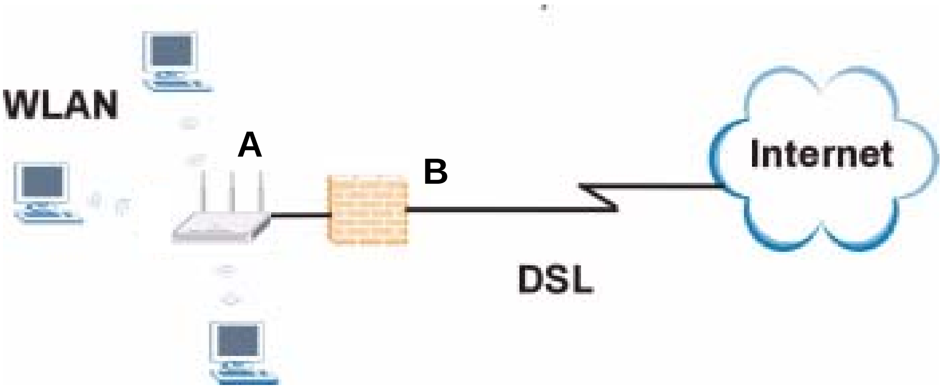
The NBG-460N also uses MIMO (Multiple-Input, Multiple-Output) antenna technology and Gigabit Ethernet ports to deliver high-speed wireless networking.

1.2 Router Mode

Select **Router Mode** if you need to route traffic between your network and another network such as the Internet, and require important network services such as a firewall or bandwidth management.

The following figure shows computers in a WLAN connecting to the NBG-460N (**A**), which has a DSL connection to the Internet. The NBG-460N is set to **Router Mode** and has router features such as a built-in firewall (**B**).

Figure 1 Secure Wireless Internet Access in Router Mode

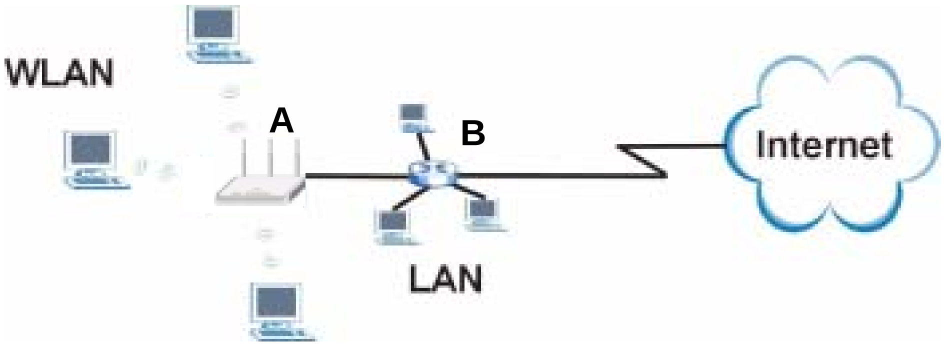


1.3 AP Mode

Select **AP Mode** if you already have a router or gateway on your network which provides network services such as a firewall or bandwidth management.

The following figure shows computers in a WLAN connecting to the NBG-460N, which acts as an access point (**A**). The NBG-460N allows the wireless computers to share the same Internet access as the other computers connected to the router (**B**) on the same network.

Figure 2 Wireless Internet Access in AP Mode



1.4 Router Features vs. AP Features

The following table shows which features are available in **Router** or **AP Mode**.

Table 1 Features Available in Router Mode vs. AP Mode

FEATURE	ROUTER MODE	AP MODE
DHCP This allows individual clients to obtain IP addresses at start-up from a DHCP server.	YES	NO
Firewall This establishes a network security barrier, protecting your network from attacks and controlling access between your network and the Internet.	YES	NO
Bandwidth Management This allows you to allocate network bandwidth to specific applications and or subnets.	YES	NO
Any IP This allows a computer to access the NBG-460N when the IP addresses of the computer and the NBG-460N are not in the same subnet.)	YES	NO
VPN A virtual private network (VPN) provides secure communications between sites without the expense of leased site-to-site lines.	YES	NO
Wireless This allows two or more devices to communicate without wires, based on IEEE 802.11 wireless standards.	YES	YES

1.5 Ways to Manage the NBG-460N

Use any of the following methods to manage the NBG-460N.

- Web Configurator. This is recommended for everyday management of the NBG-460N using a (supported) web browser.
- Command Line Interface. Line commands are mostly used for troubleshooting by service engineers.
- FTP. Use File Transfer Protocol for firmware upgrades and configuration backup/restore.

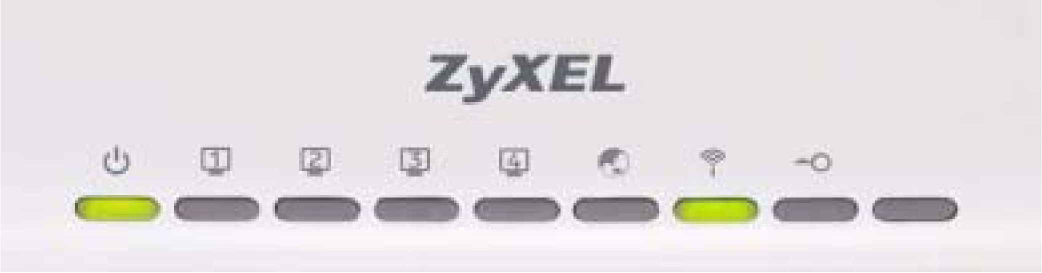
1.6 Good Habits for Managing the NBG-460N

Do the following things regularly to make the NBG-460N more secure and to manage the NBG-460N more effectively.

- Change the password. Use a password that’s not easy to guess and that consists of different types of characters, such as numbers and letters.
- Write down the password and put it in a safe place.
- Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the NBG-460N to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the NBG-460N. You could simply restore your last configuration.

1.7 LEDs

Figure 3 Front Panel



The following table describes the LEDs.

Table 2 Front Panel LEDs

LED	COLOR	STATUS	DESCRIPTION
POWER ⏻	Green	On	The NBG-460N is receiving power and functioning properly.
		Off	The NBG-460N is not receiving power.

Table 2 Front Panel LEDs (continued)

LED	COLOR	STATUS	DESCRIPTION
LAN 1-4 1 2 3 4	Green	On	The NBG-460N has a successful 10/100MB Ethernet connection.
		Blinking	The NBG-460N is sending/receiving data.
	Amber	On	The NBG-460N has a successful 1000MB Ethernet connection.
		Blinking	The NBG-460N is sending/receiving data.
		Off	The LAN is not connected.
WAN 🌐	Green	On	The NBG-460N has a successful 10/100MB WAN connection.
		Blinking	The NBG-460N is sending/receiving data.
	Amber	On	The NBG-460N has a successful 1000MB Ethernet connection.
		Blinking	The NBG-460N is sending/receiving data.
		Off	The WAN connection is not ready, or has failed.
WLAN 📶	Green	On	The NBG-460N is ready, but is not sending/receiving data through the wireless LAN.
		Blinking	The NBG-460N is sending/receiving data through the wireless LAN.
		Off	The wireless LAN is not ready or has failed.
WPS 🔑	Green	On	WPS (WiFi Protected Setup) is configured on your device.
		Blinking	The NBG-460N is attempting to connect with another wireless devices using WPS.
		Off	WPS is disabled on your device.

2

The WPS Button

2.1 Overview

Your NBG-460N supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the WiFi Alliance.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (a unique Personal Identification Number that allows one device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

For more information on using WPS, see Section 6.1.2 on page 73.

3

Introducing the Web Configurator

This chapter describes how to access the NBG-460N web configurator and provides an overview of its screens.

3.1 Web Configurator Overview

The web configurator is an HTML-based management interface that allows easy setup and management of the NBG-460N via Internet browser. Use Internet Explorer 6.0 and later or Netscape Navigator 7.0 and later versions or Safari 2.0 or later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the web configurator you need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScripts (enabled by default).
- Java permissions (enabled by default).

Refer to the Troubleshooting chapter to see how to make sure these functions are allowed in Internet Explorer.

3.2 Accessing the Web Configurator

1. Make sure your NBG-460N hardware is properly connected and prepare your computer or computer network to connect to the NBG-460N (refer to the Quick Start Guide).
2. Launch your web browser.
3. Type "http://192.168.1.1" as the website address.

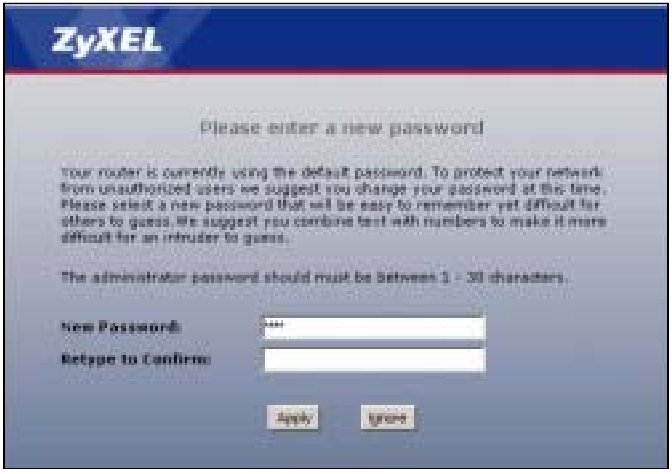
Your computer must be in the same subnet in order to access this website address.

- In **Router Mode** enable the DHCP Server. The NBG-460N assigns your computer an IP address on the same subnet.
- In **AP Mode** the NBG-460N does not assign an IP address to your computer, so you should check it's in the same subnet. See Section 5.5 on page 71 for more information.

4 Type "1234" (default) as the password and click **Login**. In some versions, the default password appears automatically - if this is the case, click **Login**.

5 You should see a screen asking you to change your password (highly recommended) as shown next. Type a new password (and retype it to confirm) and click **Apply** or click **Ignore**.

Figure 4 Change Password Screen



Please enter a new password

Your router is currently using the default password. To protect your network from unauthorized users we suggest you change your password at this time. Please select a new password that will be easy to remember yet difficult for others to guess.We suggest you combine text with numbers to make it more difficult for an intruder to guess.

The administrator password should must be between 1 - 30 characters.

New Password: ****

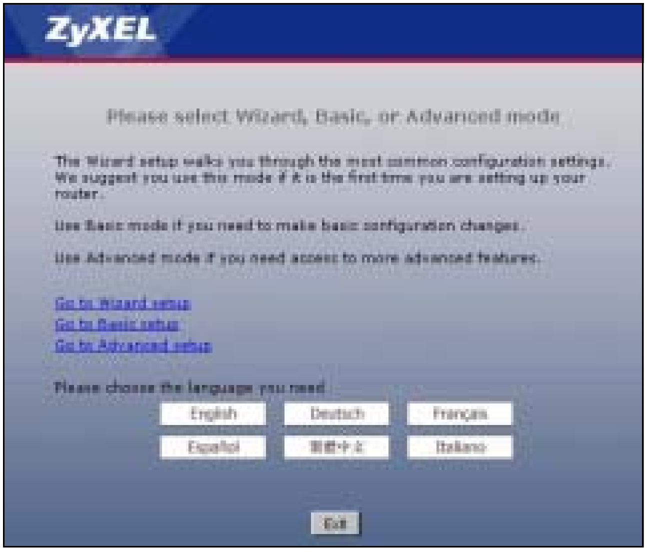
Retype to Confirm:

The management session automatically times out when the time period set in the **Administrator Inactivity Timer** field expires (default five minutes). Simply log back into the NBG-460N if this happens.

6 Select the setup mode you want to use.

- Click **Go to Wizard Setup** to use the Configuration Wizard for basic Internet and Wireless setup.
- Click **Go to Basic Setup** if you want to view and configure basic settings that are not part of the wizard setup. Not all Web Configurator screens are available in this mode. See Chapter 23 on page 257 for more information.
- **Click Go to Advanced Setup** to view and configure all the NBG-460N’s settings.
- Select a language to go to the basic web configurator in that language. To change to the advanced configurator see Chapter 23 on page 257.

Figure 5 Selecting the setup mode



Please select Wizard, Basic, or Advanced mode

The Wizard setup walks you through the most common configuration settings. We suggest you use this mode if it is the first time you are setting up your router.

Use Basic mode if you need to make basic configuration changes.

Use Advanced mode if you need access to more advanced features.

Go to Wizard setup
Go to Basic setup
Go to Advanced setup

Please choose the language you need

3.3 Resetting the NBG-460N

If you forget your password or IP address, or you cannot access the web configurator, you will need to use the **RESET** button at the back of the NBG-460N to reload the factory-default configuration file. This means that you will lose all configurations that you had previously saved, the password will be reset to “1234” and the IP address will be reset to “192.168.1.1”.

3.3.1 Procedure to Use the Reset Button

1. Make sure the power LED is on.
2. Press the **RESET** button for five seconds or until the power LED begins to blink and then release it. When the power LED begins to blink, the defaults have been restored and the NBG-460N restarts.

3.4 Navigating the Web Configurator

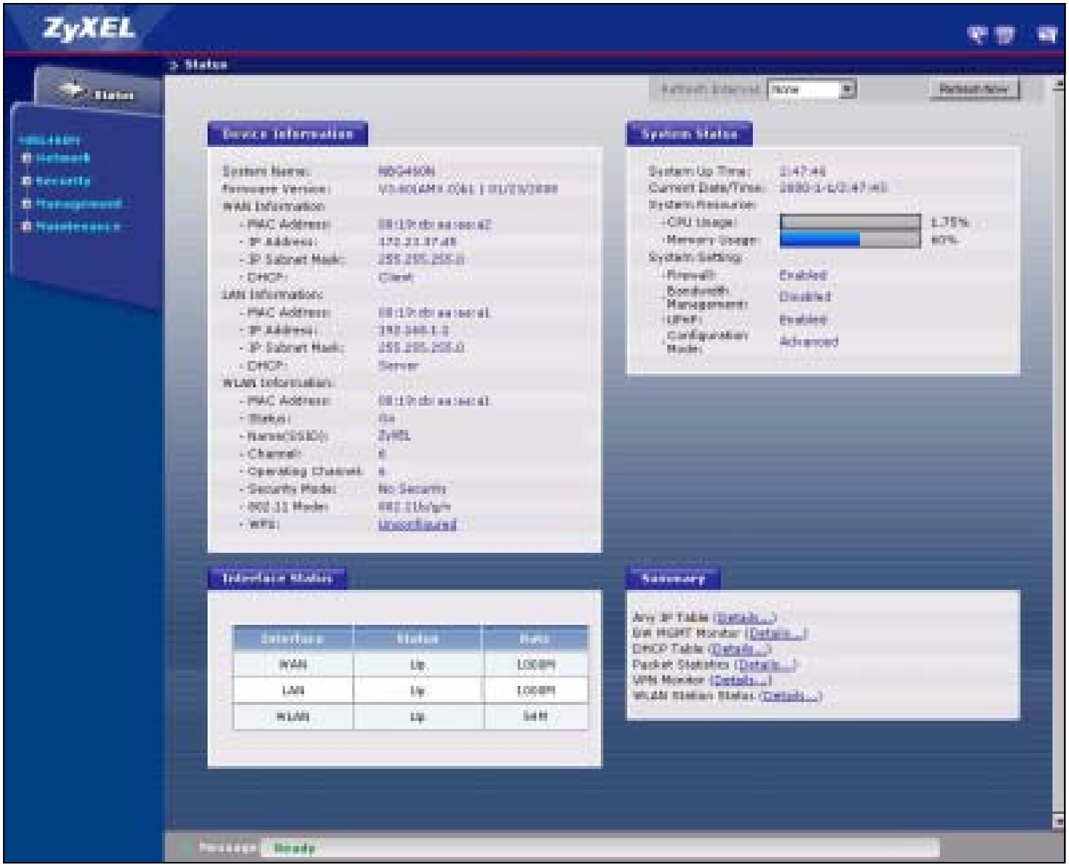
The following summarizes how to navigate the web configurator from the **Status** screen in **Router Mode** and **AP Mode**.

3.5 The Status Screen in Router Mode

Click on **Status**. The screen below shows the status screen in **Router Mode**.

(For information on the status screen in **AP Mode** see Chapter 5 on page 66.)

Figure 6 Web Configurator Status Screen



Device Information

System Name: NBG460N
Firmware Version: V3.60(AMX.0)b1 | 01/23/2008
WAN Information:
- MAC Address: [illegible]
- IP Address: 172.23.37.48
- IP Subnet Mask: 255.255.255.0
- DHCP: Client
LAN Information:
- MAC Address: [illegible]
- IP Address: 192.168.1.1
- IP Subnet Mask: 255.255.255.0
- DHCP: Server
WLAN Information:
- MAC Address: [illegible]
- Status: On
- Name(SSID): ZyXEL
- Channel: 6
- Operating Channel: 6
- Security Mode: No Security
- 802.11 Mode: 802.11b/g/n
- WPS: Unconfigured

System Status

System Up Time: 2:47:46
Current Date/Time: 2000-1-1/2:47:46
System Resource:
-CPU Usage: 1.75%
-Memory Usage: 60%
System Setting:
-Firewall: Enabled
-Bandwidth Management: Disabled
-UPnP: Enabled
-Configuration Mode: Advanced

Interface Status

Interface	Status	Rate
WAN	Up	100M
LAN	Up	100M
WLAN	Up	54M

Summary

Any IP Table (Details...)
BW MGMT Monitor (Details...)
DHCP Table (Details...)
Packet Statistics (Details...)
VPN Monitor (Details...)
WLAN Station Status (Details...)

The following table describes the icons shown in the **Status** screen.

Table 3 Status Screen Icon Key

ICON	DESCRIPTION
	Click this icon to open the setup wizard.
	Click this icon to view copyright and a link for related product information.
	Click this icon at any time to exit the web configurator.
Refresh Interval: 20 seconds	Select a number of seconds or **None** from the drop-down list box to refresh all screen statistics automatically at the end of every time interval or to not refresh the screen statistics.
Refresh Now	Click this button to refresh the status screen statistics.

The following table describes the labels shown in the **Status** screen.

Table 4 Web Configurator Status Screen

LABEL	DESCRIPTION
Device Information	
System Name	This is the **System Name** you enter in the **Maintenance** > **System** > **General** screen. It is for identification purposes.
Firmware Version	This is the firmware version and the date created.

Table 4 Web Configurator Status Screen (continued)

LABEL	DESCRIPTION
WAN Information	
- MAC Address	This shows the WAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the WAN port’s IP address.
- IP Subnet Mask	This shows the WAN port’s subnet mask.
- DHCP	This shows the WAN port’s DHCP role - **Client** or **None**.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port’s IP address.
- IP Subnet Mask	This shows the LAN port’s subnet mask.
- DHCP	This shows the LAN port’s DHCP role - **Server** or **None**.
WLAN Information	
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - **On**, **Off** or **Off by scheduler**.
- Name (SSID)	This shows a descriptive name used to identify the NBG-460N in the wireless LAN.
- Channel	This shows the channel number which you select manually.
- Operating Channel	This shows the channel number which the NBG-460N is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the NBG-460N is using.
- 802.11 Mode	This shows the wireless standard.
- WPS	This displays **Configured** when the WPS has been set up. This displays **Unconfigured** if the WPS has not been set up. Click the status to display Network > Wireless LAN > WPS screen.
System Status	
System Up Time	This is the total time the NBG-460N has been on.
Current Date/Time	This field displays your NBG-460N’s present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG-460N’s processing ability is currently used. When this percentage is close to 100%, the NBG-460N is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications (for example, using bandwidth management.
- Memory Usage	This shows what percentage of the heap memory the NBG-460N is using. Heap memory refers to the memory that is not used by ZyNOS (ZyXEL Network Operating System) and is thus available for running processes like NAT and the firewall.
System Setting	
- Firewall	This shows whether the firewall is active or not.
- Bandwidth Management	This shows whether the bandwidth management is active or not.
- UPnP	This shows whether UPnP is active or not.
- Configuration Mode	This shows whether the advanced screens of each feature are turned on (**Advanced**) or not (**Basic**).
Interface Status	
Interface	This displays the NBG-460N port types. The port types are: **WAN**, **LAN** and **WLAN**.

Table 4 Web Configurator Status Screen (continued)

LABEL	DESCRIPTION
Status	For the LAN and WAN ports, this field displays **Down** (line is down) or **Up** (line is up or connected). For the WLAN, it displays **Up** when the WLAN is enabled or **Down** when the WLAN is disabled.
Rate	For the LAN ports, this displays the port speed and duplex setting or **N/A** when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and **Idle** (line (ppp) idle), **Dial** (starting to trigger a call) and **Drop** (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays **N/A** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **N/A** when the WLAN is disabled.
Summary	
Any IP Table	Use this screen to view details of IP addresses assigned to devices not in the same subnet as the NBG-460N.
BW MGMT Monitor	Use this screen to view the NBG-460N's bandwidth usage and allotments.
DHCP Table	Use this screen to view current DHCP client information.
Packet Statistics	Use this screen to view port status and packet specific statistics.
VPN Monitor	Use this screen to view the active VPN connections.
WLAN Station Status	Use this screen to view the wireless stations that are currently associated to the NBG-460N.

3.5.1 Navigation Panel

Use the sub-menus on the navigation panel to configure NBG-460N features.

The following table describes the sub-menus.

Table 5 Screens Summary

LINK	TAB	FUNCTION
Status		This screen shows the NBG-460N's general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		
Wireless LAN	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the NBG-460N to block access to devices or block the devices from accessing the NBG-460N.
	Advanced	This screen allows you to configure advanced wireless settings.
	QoS	Use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services.
	WPS	Use this screen to configure WPS.
	WPS Station	Use this screen to add a wireless station using WPS.
	Scheduling	Use this screen to schedule the times the Wireless LAN is enabled.
WAN	Internet Connection	This screen allows you to configure ISP parameters, WAN IP address assignment, DNS servers and the WAN MAC address.
	Advanced	Use this screen to configure other advanced properties.

Table 5 Screens Summary

LINK	TAB	FUNCTION
LAN	IP	Use this screen to configure LAN IP address and subnet mask.
	IP Alias	Use this screen to partition your LAN interface into subnets.
	Advanced	Use this screen to enable other advanced properties.
DHCP Server	General	Use this screen to enable the NBG-460N's DHCP server.
	Advanced	Use this screen to assign IP addresses to specific individual computers based on their MAC addresses and to have DNS servers assigned by the DHCP server.
	Client List	Use this screen to view current DHCP client information and to always assign an IP address to a MAC address (and host name).
NAT	General	Use this screen to enable NAT.
	Application	Use this screen to configure servers behind the NBG-460N.
	Advanced	Use this screen to change your NBG-460N's port triggering settings.
DDNS	General	Use this screen to set up dynamic DNS.
Security		
Firewall	General	Use this screen to activate/deactivate the firewall.
	Services	This screen shows a summary of the firewall rules, and allows you to edit/add a firewall rule.
Content Filter	Filter	Use this screen to block certain web features and sites containing certain keywords in the URL.
	Schedule	Use this screen to set the days and times for the NBG-460N to perform content filtering.
VPN	General	Use this screen to configure VPN connections and view the rule summary.
	SA Monitor	Use this screen to display and manage active VPN connections.
Management		
Static Route	IP Static Route	Use this screen to configure IP static routes.
Bandwidth MGMT	General	Use this screen to enable bandwidth management.
	Advanced	Use this screen to set the upstream bandwidth and edit a bandwidth management rule.
	Monitor	Use this screen to view the NBG-460N's bandwidth usage and allotments.
Remote MGMT	WWW	Use this screen to configure through which interface(s) and from which IP address(es) users can use HTTP to manage the NBG-460N.
	Telnet	Use this screen to configure through which interface(s) and from which IP address(es) users can use Telnet to manage the NBG-460N.
	FTP	Use this screen to configure through which interface(s) and from which IP address(es) users can use FTP to access the NBG-460N.
	DNS	Use this screen to configure through which interface(s) and from which IP address(es) users can send DNS queries to the NBG-460N.
UPnP	General	Use this screen to enable UPnP on the NBG-460N.

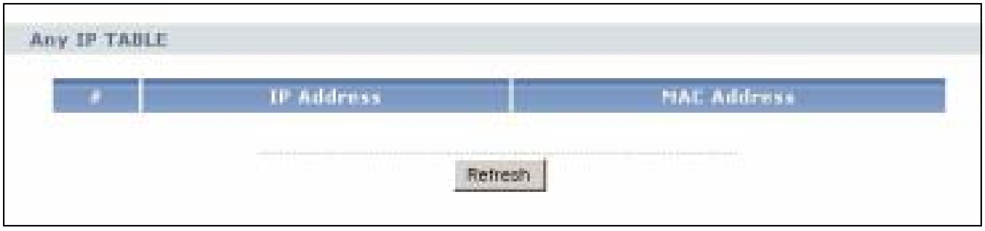
Table 5 Screens Summary

LINK	TAB	FUNCTION
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG-460N's time and date.
Logs	View Log	Use this screen to view the logs for the categories that you selected.
	Log Settings	Use this screen to change your NBG-460N's log settings.
Tools	Firmware	Use this screen to upload firmware to your NBG-460N.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG-460N.
	Restart	This screen allows you to reboot the NBG-460N without turning the power off.
	Wake On LAN	Use this screen to remotely turn on a device on the network.
Config Mode	General	This screen allows you to display or hide the advanced screens or features.
Sys OP Mode	General	This screen allows you to select whether your device acts as a Router or a Access Point.
Language		This screen allows you to select the language you prefer.

3.5.2 Summary: Any IP Table

This screen displays the IP address of each computer that is using the NBG-460N via the any IP feature. Any IP allows computers to access the Internet through the NBG-460N without changing their network settings when NAT is enabled. To access this screen, open the **Status** screen (see Section 3.5 on page 39), and click **(Details...)** next to **Any IP Table**.

Figure 7 Any IP Table



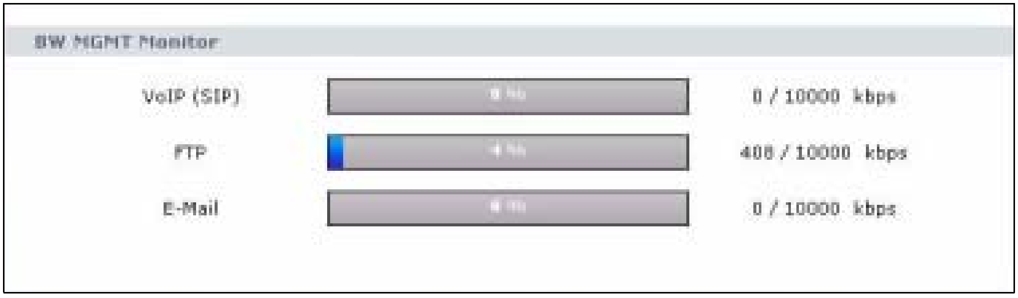
Any IP TABLE

#	IP Address	MAC Address

3.5.3 Summary: Bandwidth Management Monitor

Select the **BW MGMT Monitor (Details...)** hyperlink in **Status** screen. View the bandwidth usage of the WAN configured bandwidth rules. This is also shown as bandwidth usage over the bandwidth budget for each rule. The gray section of the bar represents the percentage of unused bandwidth and the blue color represents the percentage of bandwidth in use.

Figure 8 Summary: BW MGMT Monitor



BW MGMT Monitor

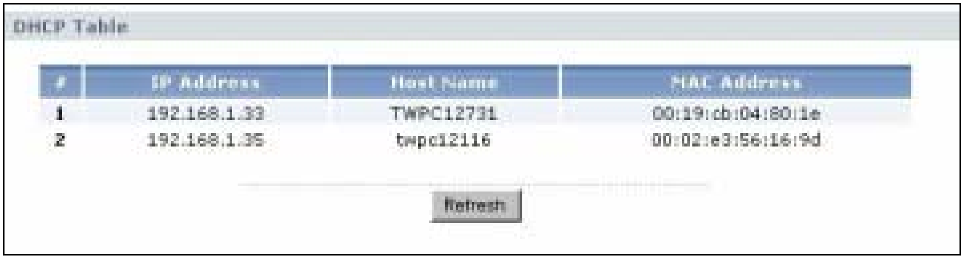
VoIP (SIP)	0 %	0 / 10000 kbps
FTP	4 %	408 / 10000 kbps
E-Mail	0 %	0 / 10000 kbps

3.5.4 Summary: DHCP Table

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the NBG-460N's LAN as a DHCP server or disable it. When configured as a server, the NBG-460N provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on that network, or else the computer must be manually configured.

Click the **DHCP Table (Details...)** hyperlink in the **Status** screen. Read-only information here relates to your DHCP status. The DHCP table shows current DHCP client information (including **IP Address**, **Host Name** and **MAC Address**) of all network clients using the NBG-460N's DHCP server.

Figure 9 Summary: DHCP Table



DHCP Table

#	IP Address	Host Name	MAC Address
1	192.168.1.33	TWPC12731	00:19:cb:04:80:1e
2	192.168.1.35	twpc12116	00:02:e3:56:16:9d

The following table describes the labels in this screen.

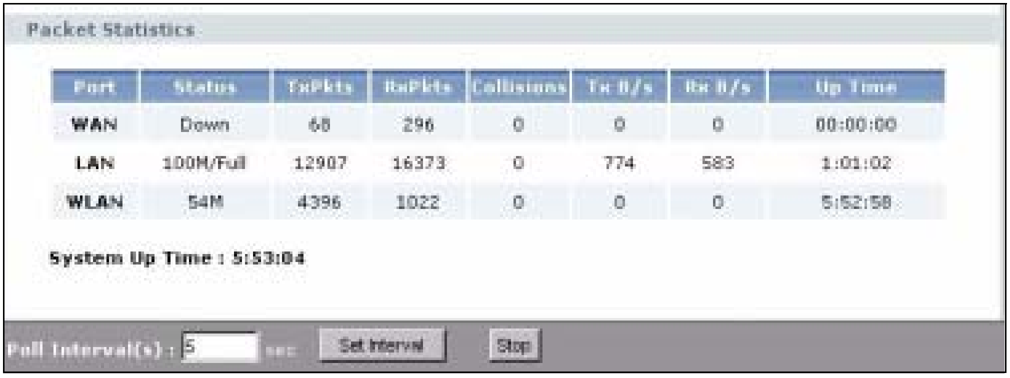
Table 6 Summary: DHCP Table

LABEL	DESCRIPTION
#	This is the index number of the host computer.
IP Address	This field displays the IP address relative to the # field listed above.
Host Name	This field displays the computer host name.
MAC Address	This field shows the MAC address of the computer with the name in the **Host Name** field. Every Ethernet device has a unique MAC (Media Access Control) address which uniquely identifies a device. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.
Refresh	Click **Refresh** to renew the screen.

3.5.5 Summary: Packet Statistics

Click the **Packet Statistics (Details...)** hyperlink in the **Status** screen. Read-only information here includes port status, packet specific statistics and the "system up time". The **Poll Interval(s)** field is configurable and is used for refreshing the screen.

Figure 10 Summary: Packet Statistics



Packet Statistics

Port	Status	TxPkts	RxPkts	Collisions	Tx B/s	Rx B/s	Up Time
WAN	Down	68	296	0	0	0	00:00:00
LAN	100M/Full	12907	16373	0	774	583	1:01:02
WLAN	54M	4396	1022	0	0	0	5:52:58

System Up Time : 5:53:04

Poll Interval(s) : 5 sec

The following table describes the labels in this screen.

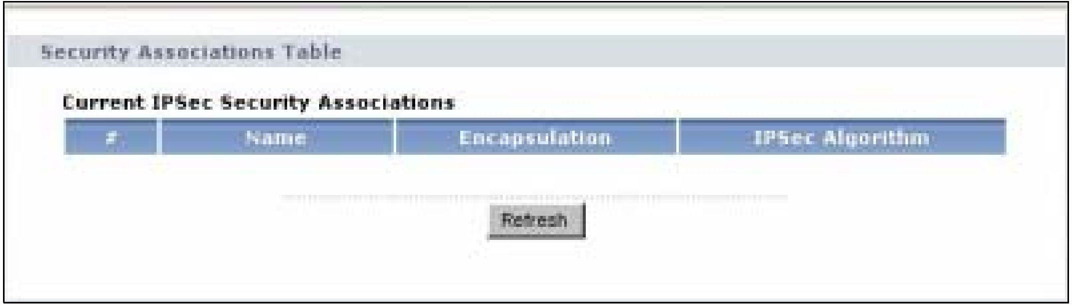
Table 7 Summary: Packet Statistics

LABEL	DESCRIPTION
Port	This is the NBG-460N's port type.
Status	For the LAN ports, this displays the port speed and duplex setting or **Down** when the line is disconnected. For the WAN port, it displays the port speed and duplex setting if you're using Ethernet encapsulation and **Idle** (line (ppp) idle), **Dial** (starting to trigger a call) and **Drop** (dropping a call) if you're using PPPoE or PPTP encapsulation. This field displays **Down** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **Down** when the WLAN is disabled.
TxPkts	This is the number of transmitted packets on this port.
RxPkts	This is the number of received packets on this port.
Collisions	This is the number of collisions on this port.
Tx B/s	This displays the transmission speed in bytes per second on this port.
Rx B/s	This displays the reception speed in bytes per second on this port.
Up Time	This is the total amount of time the line has been up.
System Up Time	This is the total time the NBG-460N has been on.
Poll Interval(s)	Enter the time interval for refreshing statistics in this field.
Set Interval	Click this button to apply the new poll interval you entered in the **Poll Interval(s)** field.
Stop	Click **Stop** to stop refreshing statistics.

3.5.6 Summary: VPN Monitor

Click the **VPN Monitor (Details...)** hyperlink in the **Status** screen. This screen displays read-only information about the active VPN connections. Click the **Refresh** button to update the screen. A Security Association (SA) is the group of security settings related to a specific VPN tunnel.

Figure 11 Summary: VPN Monitor



Security Associations Table

Current IPSec Security Associations

#	Name	Encapsulation	IPSec Algorithm

The following table describes the labels in this screen.

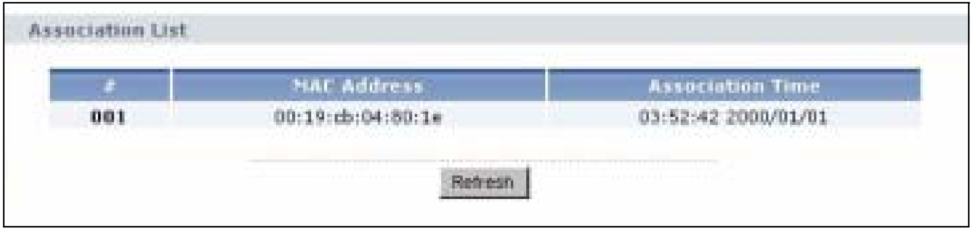
Table 8 Summary: Wireless Association List

LABEL	DESCRIPTION
#	This is the security association index number.
Name	This field displays the identification name for this VPN tunnel.
Encapsulation	This field displays **Tunnel** or **Transport** mode.
IPSec Algorithm	This field displays the security protocols used for an SA. Both AH and ESP increase NBG-460N processing requirements and communications latency (delay).
Refresh	Click this button to update the screen's statistics immediately.

3.5.7 Summary: Wireless Station Status

Click the **WLAN Station Status (Details...)** hyperlink in the **Status** screen. View the wireless stations that are currently associated to the NBG-460N in the **Association List**. Association means that a wireless client (for example, your network or computer with a wireless network card) has connected successfully to the AP (or wireless router) using the same SSID, channel and security settings.

Figure 12 Summary: Wireless Association List



Association List

#	MAC Address	Association Time
001	00:19:cb:04:80:1e	03:52:42 2000/01/01

The following table describes the labels in this screen.

Table 9 Summary: Wireless Association List

LABEL	DESCRIPTION
#	This is the index number of an associated wireless station.
MAC Address	This field displays the MAC address of an associated wireless station.
Association Time	This field displays the time a wireless station first associated with the NBG-460N's WLAN network.
Refresh	Click **Refresh** to reload the list.

4

Connection Wizard

This chapter provides information on the wizard setup screens in the web configurator.

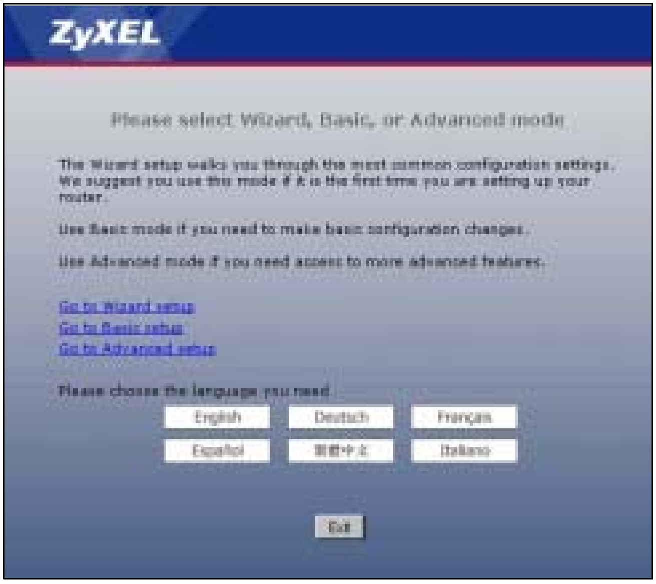
4.1 Wizard Setup

The web configurator’s wizard setup helps you configure your device to access the Internet. Refer to your ISP (Internet Service Provider) checklist in the Quick Start Guide to know what to enter in each field. Leave a field blank if you don’t have that information.

1 After you access the NBG-460N web configurator, click the **Go to Wizard setup** hyperlink.

You can click the **Go to Basic setup** or **Go to Advanced setup** hyperlink to skip this wizard setup and configure basic or advanced features accordingly.

Figure 13 Select Wizard or Advanced Mode



Please select Wizard, Basic, or Advanced mode

The Wizard setup walks you through the most common configuration settings. We suggest you use this mode if it is the first time you are setting up your router.

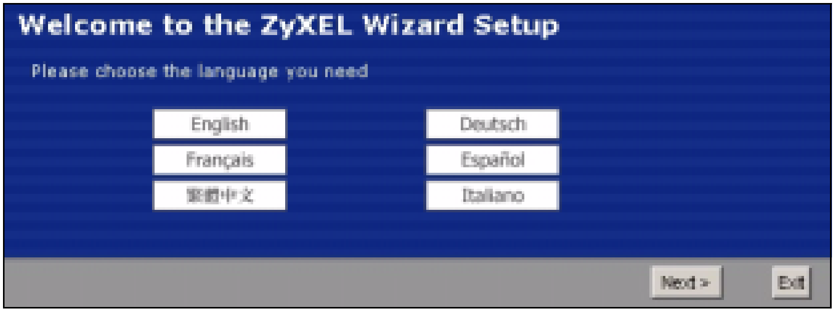
Use Basic mode if you need to make basic configuration changes.

Use Advanced mode if you need access to more advanced features.

Please choose the language you need

2 Choose a language by clicking on the language’s button. The screen will update. Click the **Next** button to proceed to the next screen.

Figure 14 Select a Language

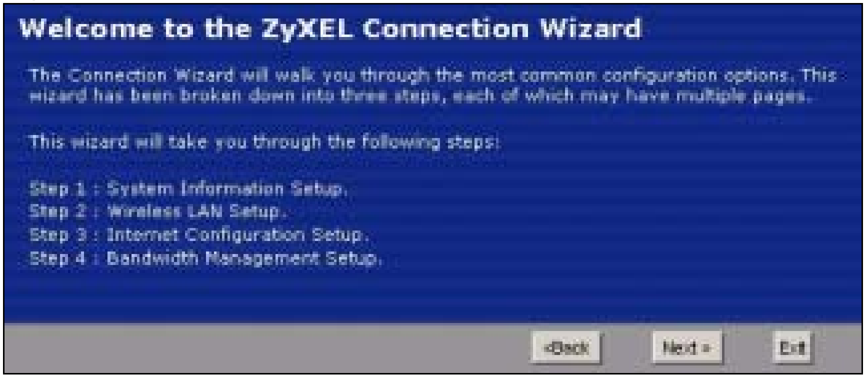


Welcome to the ZyXEL Wizard Setup

Please choose the language you need

3 Read the on-screen information and click **Next**.

Figure 15 Welcome to the Connection Wizard



Welcome to the ZyXEL Connection Wizard

The Connection Wizard will walk you through the most common configuration options. This wizard has been broken down into three steps, each of which may have multiple pages.

This wizard will take you through the following steps:

Step 1 : System Information Setup.
Step 2 : Wireless LAN Setup.
Step 3 : Internet Configuration Setup.
Step 4 : Bandwidth Management Setup.

4.2 Connection Wizard: STEP 1: System Information

System Information contains administrative and system-related information.

4.2.1 System Name

System Name is for identification purposes. However, because some ISPs check this name you should enter your computer's "Computer Name".

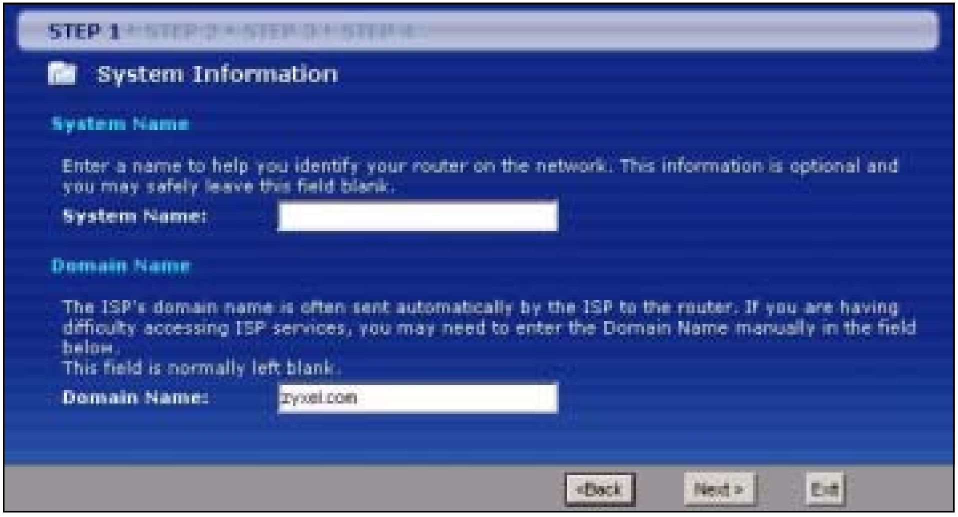
- In Windows 95/98 click **Start**, **Settings**, **Control Panel**, **Network**. Click the Identification tab, note the entry for the **Computer Name** field and enter it as the **System Name**.
- In Windows 2000, click **Start**, **Settings** and **Control Panel** and then double-click **System**. Click the **Network Identification** tab and then the **Properties** button. Note the entry for the **Computer name** field and enter it as the **System Name**.
- In Windows XP, click **Start**, **My Computer**, **View system information** and then click the **Computer Name** tab. Note the entry in the **Full computer name** field and enter it as the NBG-460N **System Name**.

4.2.2 Domain Name

The **Domain Name** entry is what is propagated to the DHCP clients on the LAN. If you leave this blank, the domain name obtained by DHCP from the ISP is used. While you must enter the host name (System Name) on each individual computer, the domain name can be assigned from the NBG-460N via DHCP.

Click **Next** to configure the NBG-460N for Internet access.

Figure 16 Wizard Step 1: System Information



System Information

System Name

Enter a name to help you identify your router on the network. This information is optional and you may safely leave this field blank.

System Name:

Domain Name

The ISP's domain name is often sent automatically by the ISP to the router. If you are having difficulty accessing ISP services, you may need to enter the Domain Name manually in the field below.
This field is normally left blank.

Domain Name: zyxel.com

The following table describes the labels in this screen.

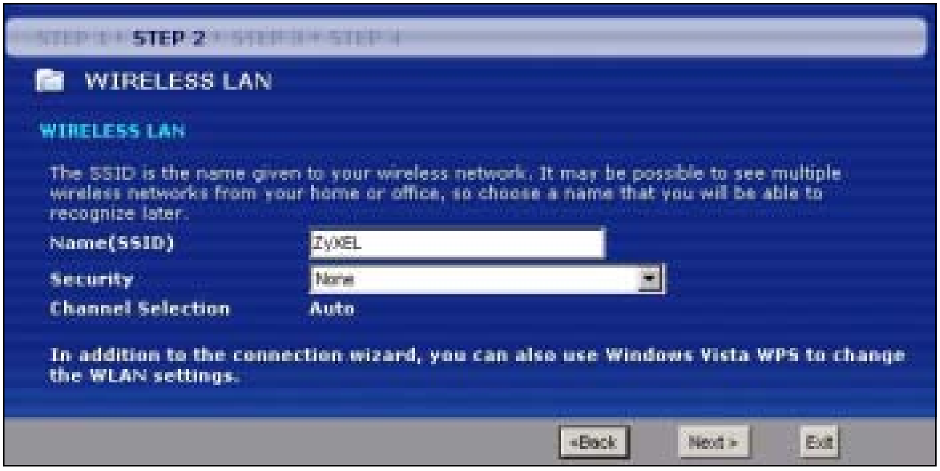
Table 10 Wizard Step 1: System Information

LABEL	DESCRIPTION
System Name	System Name is a unique name to identify the NBG-460N in an Ethernet network. Enter a descriptive name. This name can be up to 30 alphanumeric characters long. Spaces are not allowed, but dashes "-" and underscores "_" are accepted.
Domain Name	Type the domain name (if you know it) here. If you leave this field blank, the ISP may assign a domain name via DHCP. The domain name entered by you is given priority over the ISP assigned domain name.
Back	Click **Back** to display the previous screen.
Next	Click **Next** to proceed to the next screen.
Exit	Click **Exit** to close the wizard screen without saving.

4.3 Connection Wizard: STEP 2: Wireless LAN

Set up your wireless LAN using the following screen.

Figure 17 Wizard Step 2: Wireless LAN



WIRELESS LAN

The SSID is the name given to your wireless network. It may be possible to see multiple wireless networks from your home or office, so choose a name that you will be able to recognize later.

Name(SSID) ZyXEL

Security None

Channel Selection Auto

In addition to the connection wizard, you can also use Windows Vista WPS to change the WLAN settings.

The following table describes the labels in this screen.

Table 11 Wizard Step 2: Wireless LAN

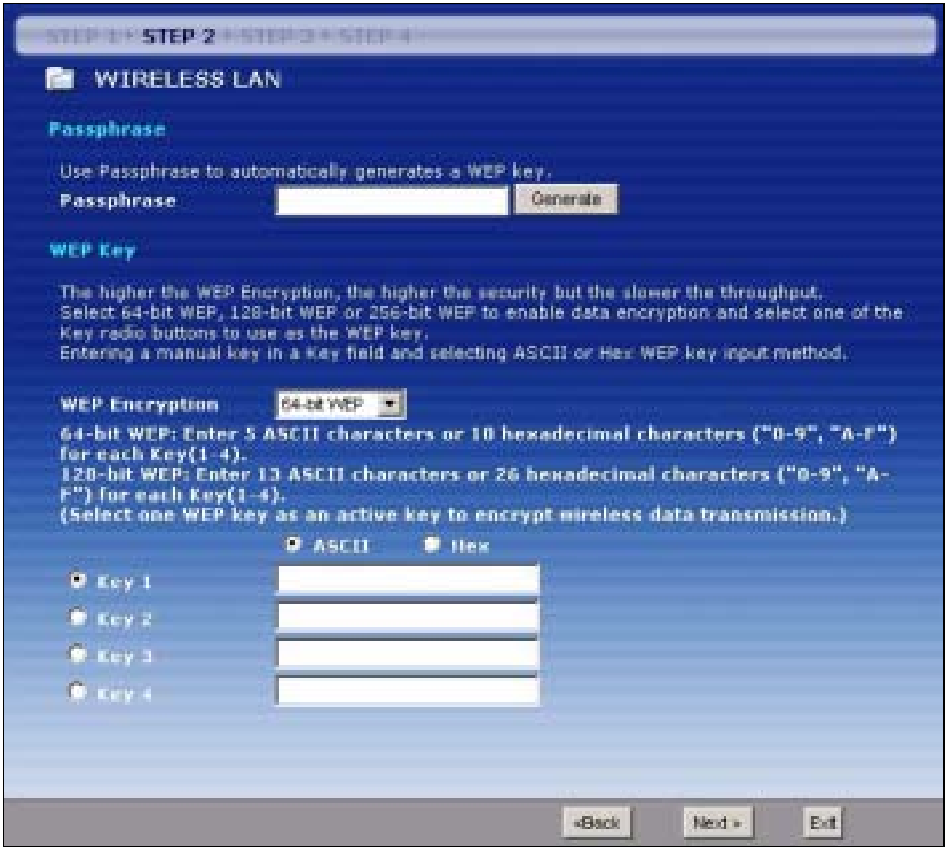
LABEL	DESCRIPTION
Name (SSID)	Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN. If you change this field on the NBG-460N, make sure all wireless stations use the same SSID in order to access the network.
Security	Select a **Security** level from the drop-down list box. Choose **Auto (WPA2-PSK)** to have the NBG-460N generate a pre-shared key automatically. After you click **Next** a screen pops up displaying the generated pre-shared key. Write down the key for use later when connecting other wireless devices to your network. Click **OK** to continue. Choose **None** to have no wireless LAN security configured. If you do not enable any wireless security on your NBG-460N, your network is accessible to any wireless networking device that is within range. If you choose this option, skip directly to Section 4.4 on page 54. Choose **Basic (WEP)** security if you want to configure WEP Encryption parameters. If you choose this option, go directly to Section 4.3.1 on page 53. This option is only available if WPS is not enabled. Choose **Extend** (**WPA-PSK** or **WPA2-PSK**) security to configure a Pre-Shared Key. Choose this option only if your wireless clients support WPA-PSK or WPA2-PSK respectively. If you choose this option, skip directly to Section 4.3.2 on page 54.
Channel Selection	The range of radio frequencies used by IEEE 802.11b/g/n wireless devices is called a channel. The device will automatically select the channel with the least interference.
Back	Click **Back** to display the previous screen.
Next	Click **Next** to proceed to the next screen.
Exit	Click **Exit** to close the wizard screen without saving.

The wireless stations and NBG-460N must use the same SSID, channel ID and WEP encryption key (if WEP is enabled), WPA-PSK (if WPA-PSK is enabled) or WPA2-PSK (if WPA2-PSK is enabled) for wireless communication.

4.3.1 Basic (WEP) Security

Choose **Basic (WEP)** to setup WEP Encryption parameters.

Figure 18 Wizard Step 2: Basic (WEP) Security



WIRELESS LAN

Passphrase

Use Passphrase to automatically generates a WEP key.

Passphrase

WEP Key

The higher the WEP Encryption, the higher the security but the slower the throughput.
Select 64-bit WEP, 128-bit WEP or 256-bit WEP to enable data encryption and select one of the Key radio buttons to use as the WEP key.
Entering a manual key in a Key field and selecting ASCII or Hex WEP key input method.

WEP Encryption: 64-bit WEP

64-bit WEP: Enter 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F") for each Key(1-4).
128-bit WEP: Enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F") for each Key(1-4).
(Select one WEP key as an active key to encrypt wireless data transmission.)

● ASCII ○ Hex

● Key 1
○ Key 2
○ Key 3
○ Key 4

The following table describes the labels in this screen.

Table 12 Wizard Step 2: Basic (WEP) Security

LABEL	DESCRIPTION
Passphrase	Type a Passphrase (up to 32 printable characters) and click **Generate**. The NBG-460N automatically generates a WEP key.
WEP Encryption	Select **64-bit WEP** or **128-bit WEP** to allow data encryption.
ASCII	Select this option in order to enter ASCII characters as the WEP keys.
HEX	Select this option to enter hexadecimal characters as the WEP keys. The preceding “0x” is entered automatically.
Key 1 to Key 4	The WEP keys are used to encrypt data. Both the NBG-460N and the wireless stations must use the same WEP key for data transmission. If you chose **64-bit WEP**, then enter any 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F"). If you chose **128-bit WEP**, then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F"). You must configure at least one key, only one key can be activated at any one time. The default key is key 1.
Back	Click **Back** to display the previous screen.

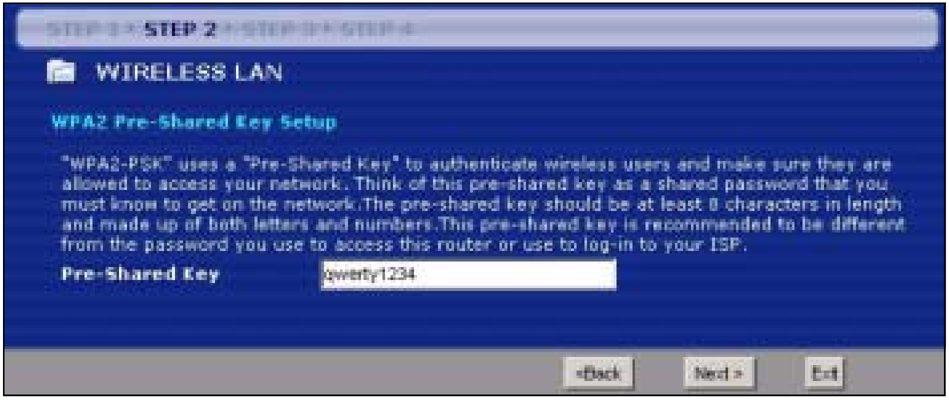
Table 12 Wizard Step 2: Basic (WEP) Security

LABEL	DESCRIPTION
Next	Click **Next** to proceed to the next screen.
Exit	Click **Exit** to close the wizard screen without saving.

4.3.2 Extend (WPA-PSK or WPA2-PSK) Security

Choose **Extend (WPA-PSK)** or **Extend (WPA2-PSK)** security in the Wireless LAN setup screen to set up a **Pre-Shared Key**.

Figure 19 Wizard Step 2: Extend (WPA-PSK or WPA2-PSK) Security



WIRELESS LAN

WPA2 Pre-Shared Key Setup

"WPA2-PSK" uses a "Pre-Shared Key" to authenticate wireless users and make sure they are allowed to access your network. Think of this pre-shared key as a shared password that you must know to get on the network.The pre-shared key should be at least 8 characters in length and made up of both letters and numbers.This pre-shared key is recommended to be different from the password you use to access this router or use to log-in to your ISP.

Pre-Shared Key: qwerty1234

The following table describes the labels in this screen.

Table 13 Wizard Step 2: Extend (WPA-PSK or WPA2-PSK) Security

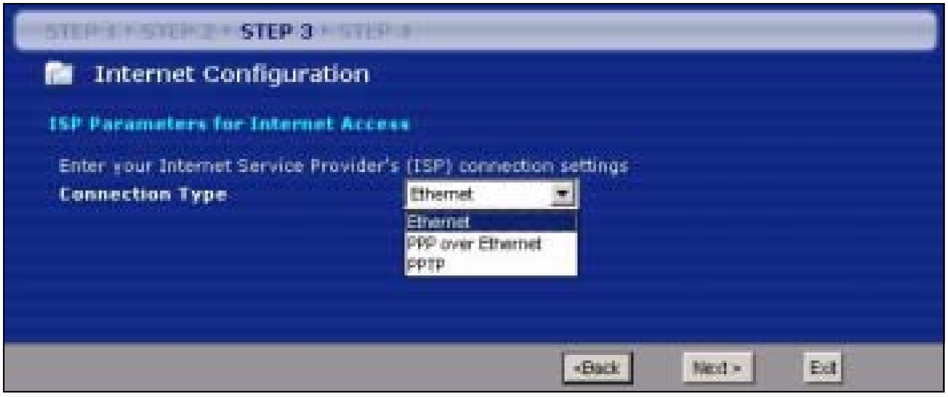
LABEL	DESCRIPTION
Pre-Shared Key	Type from 8 to 63 case-sensitive ASCII characters. You can set up the most secure wireless connection by configuring WPA in the wireless LAN screens. You need to configure an authentication server to do this.
Back	Click **Back** to display the previous screen.
Next	Click **Next** to proceed to the next screen.
Exit	Click **Exit** to close the wizard screen without saving.

4.4 Connection Wizard: STEP 3: Internet Configuration

The NBG-460N offers three Internet connection types. They are **Ethernet**, **PPP over Ethernet** or **PPTP**. The wizard attempts to detect which WAN connection type you are using. If the wizard does not detect a connection type, you must select one from the drop-down list box. Check with your ISP to make sure you use the correct type.

This wizard screen varies according to the connection type that you select.

Figure 20 Wizard Step 3: ISP Parameters.



Internet Configuration

ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type: Ethernet

The following table describes the labels in this screen,

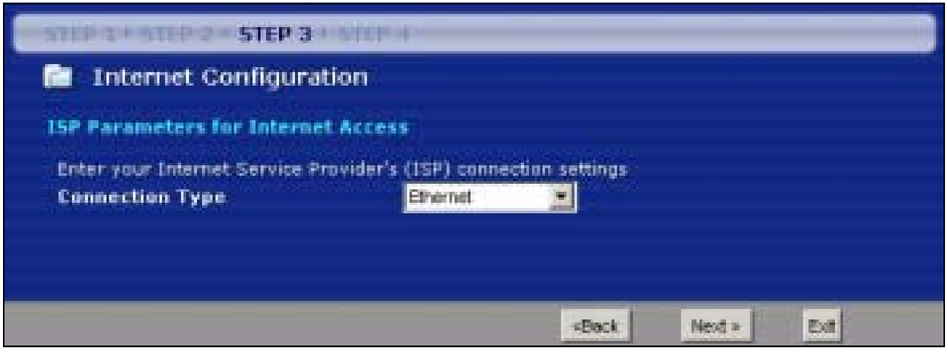
Table 14 Wizard Step 3: ISP Parameters

CONNECTION TYPE	DESCRIPTION
Ethernet	Select the **Ethernet** option when the WAN port is used as a regular Ethernet.
PPPoE	Select the **PPP over Ethernet** option for a dial-up connection. If your ISP gave you an IP address and/or subnet mask, then select **PPTP**.
PPTP	Select the **PPTP** option for a dial-up connection.

4.4.1 Ethernet Connection

Choose **Ethernet** when the WAN port is used as a regular Ethernet. Continue to Section 4.4.4 on page 58.

Figure 21 Wizard Step 3: Ethernet Connection



Internet Configuration

ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type: Ethernet

4.4.2 PPPoE Connection

Point-to-Point Protocol over Ethernet (PPPoE) functions as a dial-up connection. PPPoE is an IETF (Internet Engineering Task Force) standard specifying how a host personal computer interacts with a broadband modem (for example DSL, cable, wireless, etc.) to achieve access to high-speed data networks.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for instance, RADIUS).

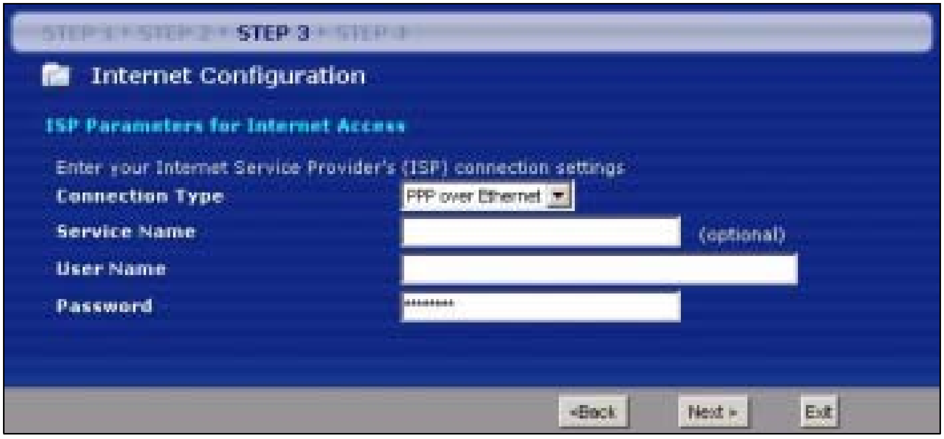
One of the benefits of PPPoE is the ability to let end users access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for specific users.

Operationally, PPPoE saves significant effort for both the subscriber and the ISP/carrier, as it requires no specific configuration of the broadband modem at the subscriber's site.

By implementing PPPoE directly on the NBG-460N (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG-460N does that part of the task. Furthermore, with NAT, all of the LAN's computers will have Internet access.

Refer to the appendix for more information on PPPoE.

Figure 22 Wizard Step 3: PPPoE Connection



ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type: PPP over Ethernet

Service Name: (optional)

User Name:

Password: ********

The following table describes the labels in this screen.

Table 15 Wizard Step 3: PPPoE Connection

LABEL	DESCRIPTION
ISP Parameter for Internet Access	
Connection Type	Select the **PPP over Ethernet** option for a dial-up connection.
Service Name	Type the name of your service provider.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

4.4.3 PPTP Connection

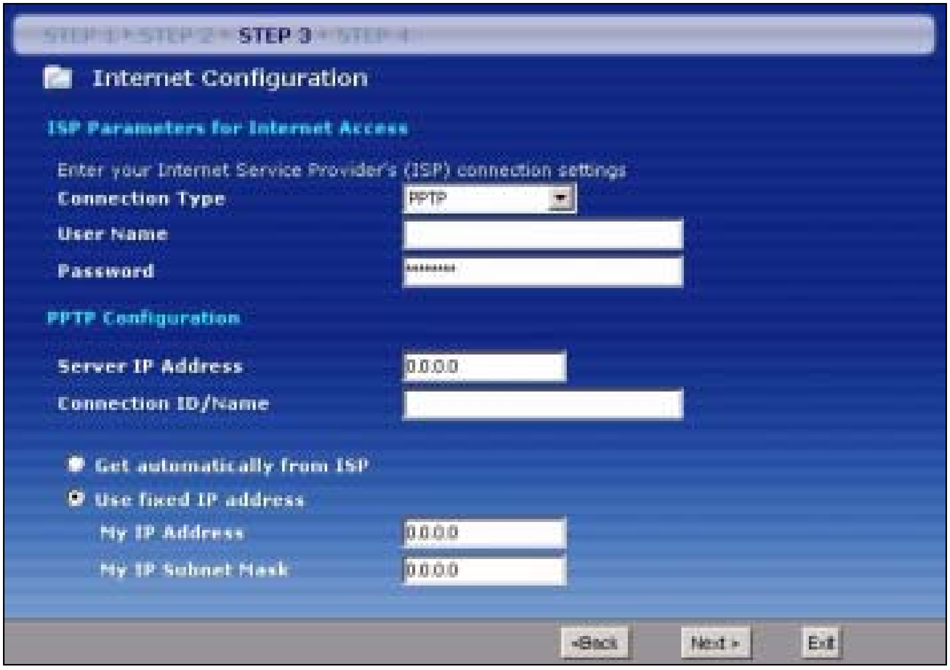
Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables transfers of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

PPTP supports on-demand, multi-protocol, and virtual private networking over public networks, such as the Internet.

Refer to the appendix for more information on PPTP.

The NBG-460N supports one PPTP server connection at any given time.

Figure 23 Wizard Step 3: PPTP Connection



STEP 1 > STEP 2 > STEP 3 > STEP 4

Internet Configuration

ISP Parameters for Internet Access

Enter your Internet Service Provider's (ISP) connection settings

Connection Type: PPTP

User Name:

Password: ********

PPTP Configuration

Server IP Address: 0.0.0.0

Connection ID/Name:

● Get automatically from ISP

○ Use fixed IP address

My IP Address: 0.0.0.0

My IP Subnet Mask: 0.0.0.0

The following table describes the fields in this screen

Table 16 Wizard Step 3: PPTP Connection

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Connection Type	Select **PPTP** from the drop-down list box. To configure a PPTP client, you must configure the **User Name** and **Password** fields for a PPP connection and the PPTP parameters for a PPTP connection.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the User Name above.
PPTP Configuration	
Server IP Address	Type the IP address of the PPTP server.
Connection ID/ Name	Enter the connection ID or connection name in this field. It must follow the "c:id" and "n:name" format. For example, C:12 or N:My ISP. This field is optional and depends on the requirements of your ISP.
Get automatically from ISP	Select this radio button if your ISP did not assign you a fixed IP address.
Use fixed IP address	Select this radio button, provided by your ISP to give the NBG-460N a fixed, unique IP address.
My IP Address	Type the (static) IP address assigned to you by your ISP.
My IP Subnet Mask	Type the subnet mask assigned to you by your ISP (if given).
Back	Click **Back** to return to the previous screen.

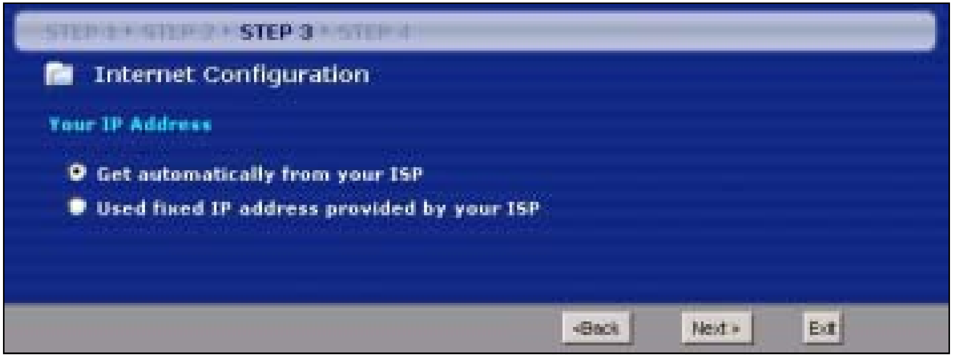
Table 16 Wizard Step 3: PPTP Connection

LABEL	DESCRIPTION
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

4.4.4 Your IP Address

The following wizard screen allows you to assign a fixed IP address or give the NBG-460N an automatically assigned IP address depending on your ISP.

Figure 24 Wizard Step 3: Your IP Address



Internet Configuration

Your IP Address

● Get automatically from your ISP
○ Used fixed IP address provided by your ISP

The following table describes the labels in this screen

Table 17 Wizard Step 3: Your IP Address

LABEL	DESCRIPTION
Get automatically from your ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection. If you choose this option, skip directly to Section 4.4.9 on page 61.
Use fixed IP address provided by your ISP	Select this option if you were given IP address and/or DNS server settings by the ISP. The fixed IP address should be in the same subnet as your broadband modem or router.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

4.4.5 WAN IP Address Assignment

Every computer on the Internet must have a unique IP address. If your networks are isolated from the Internet, for instance, only between your two branch offices, you can assign any IP addresses to the hosts without problems. However, the Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of IP addresses specifically for private networks.

Table 18 Private IP Address Ranges

10.0.0.0	-	10.255.255.255
172.16.0.0	-	172.31.255.255
192.168.0.0	-	192.168.255.255

You can obtain your IP address from the IANA, from an ISP or have it assigned by a private network. If you belong to a small organization and your Internet access is through an ISP, the ISP can provide you with the Internet addresses for your local networks. On the other hand, if you are part of a much larger organization, you should consult your network administrator for the appropriate IP addresses.

Regardless of your particular situation, do not create an arbitrary IP address; always follow the guidelines above. For more information on address assignment, please refer to RFC 1597, Address Allocation for Private Internets and RFC 1466, Guidelines for Management of IP Address Space.

4.4.6 IP Address and Subnet Mask

Similar to the way houses on a street share a common street name, so too do computers on a LAN share one common network number.

Where you obtain your network number depends on your particular situation. If the ISP or your network administrator assigns you a block of registered IP addresses, follow their instructions in selecting the IP addresses and the subnet mask.

If the ISP did not explicitly give you an IP network number, then most likely you have a single user account and the ISP will assign you a dynamic IP address when the connection is established. The Internet Assigned Number Authority (IANA) reserved this block of addresses specifically for private use; please do not use any other number unless you are told otherwise. Let's say you select 192.168.1.0 as the network number; which covers 254 individual addresses, from 192.168.1.1 to 192.168.1.254 (zero and 255 are reserved). In other words, the first three numbers specify the network number while the last number identifies an individual computer on that network.

Once you have decided on the network number, pick an IP address that is easy to remember, for instance, 192.168.1.1, for your NBG-460N, but make sure that no other device on your network is using that IP address.

The subnet mask specifies the network number portion of an IP address. Your NBG-460N will compute the subnet mask automatically based on the IP address that you entered. You don't need to change the subnet mask computed by the NBG-460N unless you are instructed to do otherwise.

4.4.7 DNS Server Address Assignment

Use DNS (Domain Name System) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of www.zyxel.com is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it.

The NBG-460N can get the DNS server addresses in the following ways.

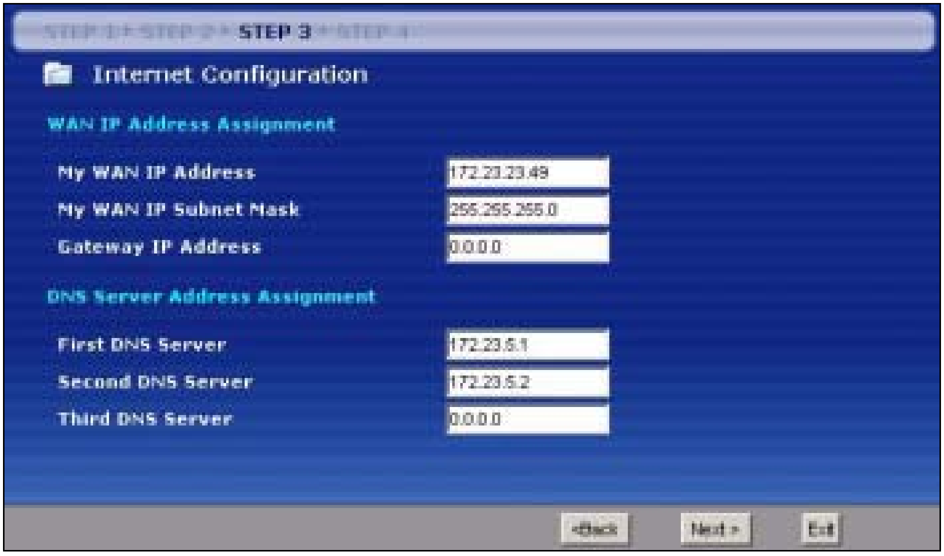
1 The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, enter them in the **DNS Server** fields in the **Wizard** and/or **WAN > Internet Connection** screen.

2 If the ISP did not give you DNS server information, leave the **DNS Server** fields set to **0.0.0.0** in the **Wizard** screen and/or set to **From ISP** in the **WAN > Internet Connection** screen for the ISP to dynamically assign the DNS server IP addresses.

4.4.8 WAN IP and DNS Server Address Assignment

The following wizard screen allows you to assign a fixed WAN IP address and DNS server addresses.

Figure 25 Wizard Step 3: WAN IP and DNS Server Addresses



Internet Configuration

WAN IP Address Assignment

My WAN IP Address: 172.23.23.49
My WAN IP Subnet Mask: 255.255.255.0
Gateway IP Address: 0.0.0.0

DNS Server Address Assignment

First DNS Server: 172.23.5.1
Second DNS Server: 172.23.5.2
Third DNS Server: 0.0.0.0

The following table describes the labels in this screen

Table 19 Wizard Step 3: WAN IP and DNS Server Addresses

LABEL	DESCRIPTION
WAN IP Address Assignment	
My WAN IP Address	Enter your WAN IP address in this field. The WAN IP address should be in the same subnet as your DSL/Cable modem or router.
My WAN IP Subnet Mask	Enter the IP subnet mask in this field.
Gateway IP Address	Enter the gateway IP address in this field.
System DNS Server Address Assignment (if applicable) DNS (Domain Name System) is for mapping a domain name to its corresponding IP address and vice versa. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it. The NBG-460N uses a system DNS server (in the order you specify here) to resolve domain names for DDNS and the time server.	
First DNS Server Second DNS Server Third DNS Server	Enter the DNS server's IP address in the fields provided. If you do not configure a system DNS server, you must use IP addresses when configuring DDNS and the time server.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

4.4.9 WAN MAC Address

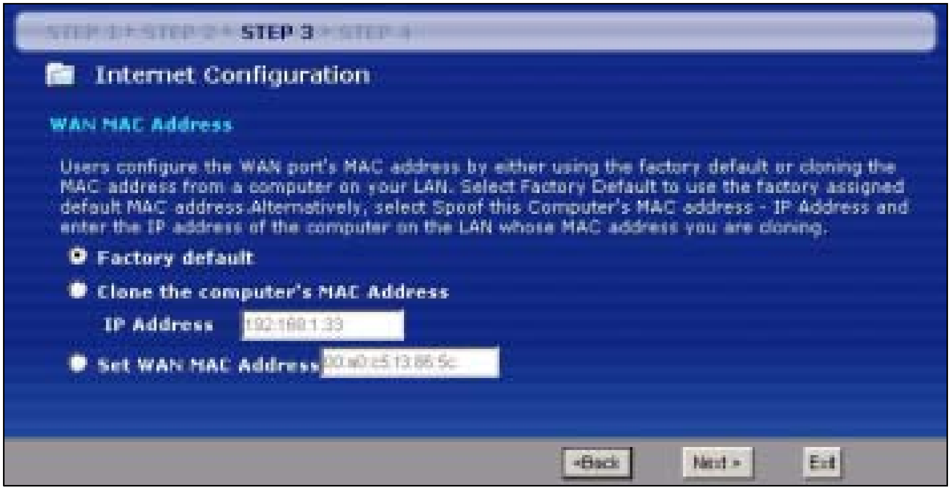
Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.

Table 20 Example of Network Properties for LAN Servers with Fixed IP Addresses

Choose an IP address	192.168.1.2-192.168.1.32; 192.168.1.65-192.168.1.254.
Subnet mask	255.255.255.0
Gateway (or default route)	192.168.1.1(NBG-460N LAN IP)

This screen allows users to configure the WAN port's MAC address by either using the NBG-460N's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address. Once it is successfully configured, the address will be copied to the "rom" file (ZyNOS configuration file). It will not change unless you change the setting or upload a different "rom" file. It is advisable to clone the MAC address from a computer on your LAN even if your ISP does not presently require MAC address authentication.

Figure 26 Wizard Step 3: WAN MAC Address



Internet Configuration

WAN MAC Address

Users configure the WAN port's MAC address by either using the factory default or cloning the MAC address from a computer on your LAN. Select Factory Default to use the factory assigned default MAC address.Alternatively, select Spoof this Computer's MAC address - IP Address and enter the IP address of the computer on the LAN whose MAC address you are cloning.

● Factory default

○ Clone the computer's MAC Address

IP Address: 192.168.1.33

○ Set WAN MAC Address: 00:a0:c5:13:86:5c

The following table describes the fields in this screen.

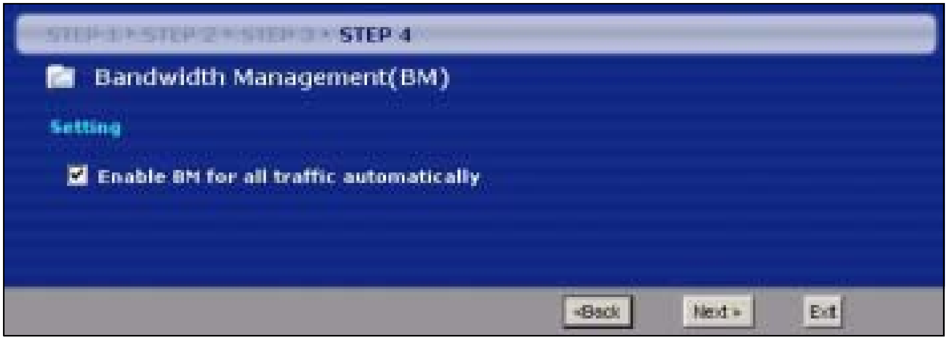
Table 21 Wizard Step 3: WAN MAC Address

LABEL	DESCRIPTION
Factory Default	Select **Factory Default** to use the factory assigned default MAC address.
Clone the computer's MAC address	Select this option and enter the IP address of the computer on the LAN whose MAC you are cloning. It is advisable to clone the MAC address from a computer on your LAN even if your ISP does not presently require MAC address authentication.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

4.5 Connection Wizard: STEP 4: Bandwidth management

Bandwidth management allows you to control the amount of bandwidth going out through the NBG-460N’s WAN, LAN or WLAN port and prioritize the distribution of the bandwidth according to the traffic type. This helps keep one service from using all of the available bandwidth and shutting out other users.

Figure 27 Wizard Step 4: Bandwidth Management



☑ Enable BM for all traffic automatically

The following fields describe the label in this screen.

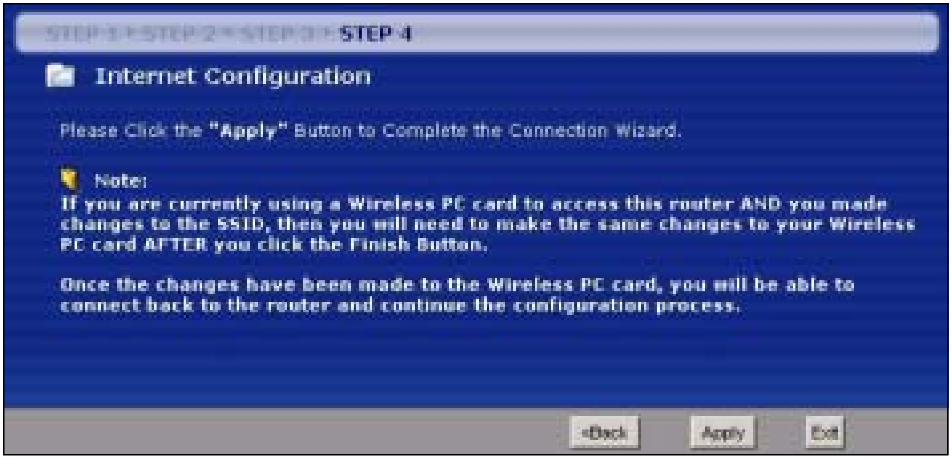
Table 22 Wizard Step 4: Bandwidth Management

LABEL	DESCRIPTION
Enable BM for all traffic automatically	Select the check box to have the NBG-460N apply bandwidth management to traffic going out through the NBG-460N’s WAN, LAN, HomePlug AV or WLAN port. Bandwidth is allocated according to the traffic type automatically. Real-time packets, such as VoIP traffic always get higher priority.
Back	Click **Back** to return to the previous screen.
Next	Click **Next** to continue.
Exit	Click **Exit** to close the wizard screen without saving.

4.6 Connection Wizard Complete

Click **Apply** to save your configuration.

Figure 28 Connection Wizard Save



STEP 1 > STEP 2 > STEP 3 > STEP 4

Internet Configuration

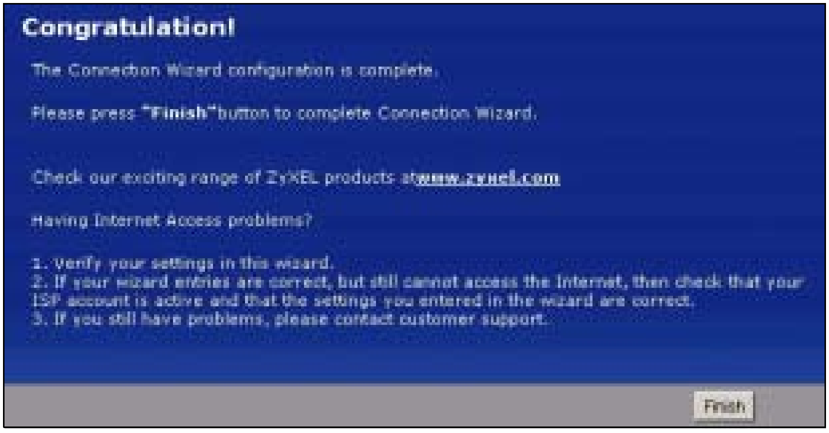
Please Click the **"Apply"** Button to Complete the Connection Wizard.

Note:
If you are currently using a Wireless PC card to access this router AND you made changes to the SSID, then you will need to make the same changes to your Wireless PC card AFTER you click the Finish Button.

Once the changes have been made to the Wireless PC card, you will be able to connect back to the router and continue the configuration process.

Follow the on-screen instructions and click **Finish** to complete the wizard setup.

Figure 29 Connection Wizard Complete



Congratulation!

The Connection Wizard configuration is complete.

Please press **"Finish"**button to complete Connection Wizard.

Check our exciting range of ZyXEL products at**www.zyxel.com**

Having Internet Access problems?

1. Verify your settings in this wizard.
2. If your wizard entries are correct, but still cannot access the Internet, then check that your ISP account is active and that the settings you entered in the wizard are correct.
3. If you still have problems, please contact customer support.

Well done! You have successfully set up your NBG-460N to operate on your network and access the Internet.

5

AP Mode

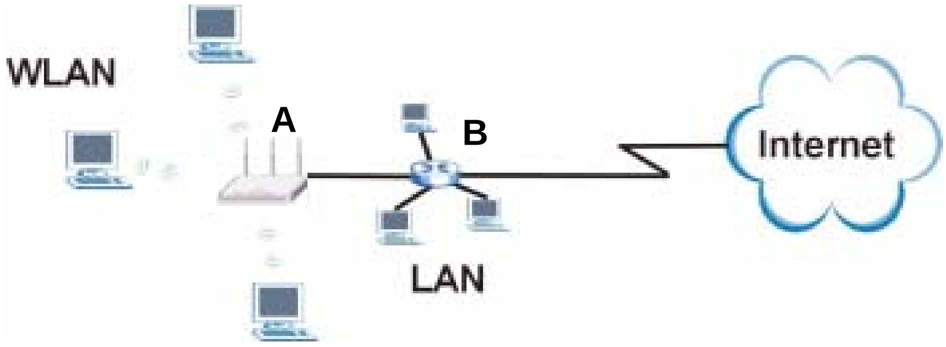
This chapter discusses how to configure settings while your NBG-460N is set to **AP Mode**. Many screens that are available in **Router Mode** are not available in **AP Mode**.

See Chapter 6 on page 73 for an example of setting up a wireless network in AP mode.

5.1 AP Mode Overview

Use your NBG-460N as an AP if you already have a router or gateway on your network. In this mode your device bridges a wired network (LAN) and wireless LAN (WLAN) in the same subnet. See the figure below for an example.

Figure 30 Wireless Internet Access in AP Mode

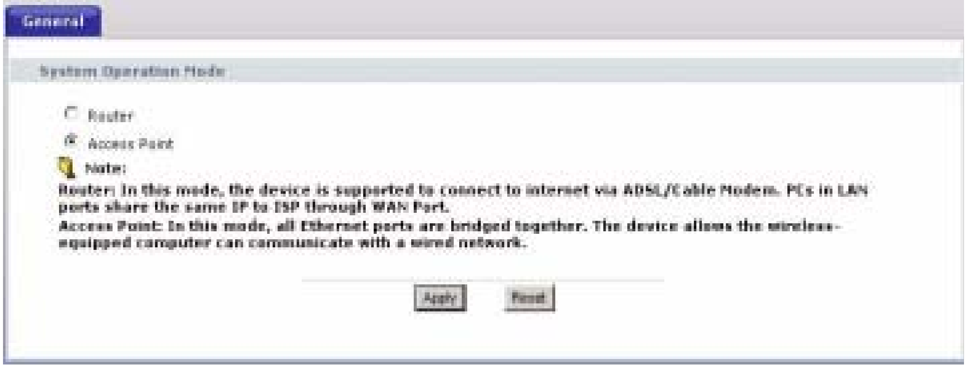


5.2 Setting your NBG-460N to AP Mode

1 Log into the web configurator if you haven’t already. See the Quick start Guide for instructions on how to do this.

2 To set your NBG-460N to **AP Mode**, go to **Maintenance** > **Sys OP Mode** > **General** and select **Access Point.**

Figure 31 Maintenance > Sys OP Mode > General



System Operation Mode

○ Router

● Access Point

Note:

Router: In this mode, the device is supported to connect to internet via ADSL/Cable Modem. PCs in LAN ports share the same IP to ISP through WAN Port.

Access Point: In this mode, all Ethernet ports are bridged together. The device allows the wireless-equipped computer can communicate with a wired network.

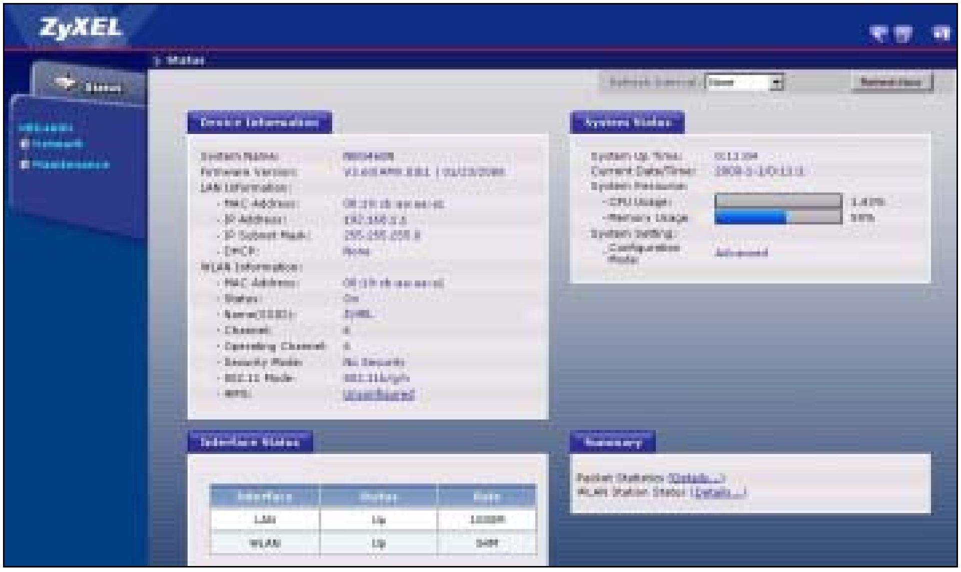
3 A pop-up appears providing information on this mode. Click **OK** in the pop-up message window. (See Section 24.2 on page 260 for more information on the pop-up.) Click **Apply**. Your NBG-460N is now in **AP Mode**.

You do not have to log in again or restart your device when you change modes.

5.3 The Status Screen in AP Mode

Click on **Status**. The screen below shows the status screen in **AP Mode**.

Figure 32 Status: AP Mode



Refresh Interval: None

Device Information

System Name: NBG460N
Firmware Version: [illegible]
LAN Information:
- MAC Address: [illegible]
- IP Address: 192.168.1.2
- IP Subnet Mask: 255.255.255.0
- DHCP: None
WLAN Information:
- MAC Address: [illegible]
- Status: On
- Name(SSID): ZyXEL
- Channel: 6
- Operating Channel: 6
- Security Mode: No Security
- 802.11 Mode: 802.11b/g/n
- WPS: Unconfigured

System Status

System Up Time: [illegible]
Current Date/Time: [illegible]
System Resource:
- CPU Usage: 1.40%
- Memory Usage: 59%
System Setting:
- Configuration Mode: Advanced

Interface Status

Interface	Status	Rate
LAN	Up	100M
WLAN	Up	54M

Summary

Packet Statistics: (Details...)
WLAN Station Status: (Details...)

The following table describes the labels shown in the **Status** screen.

Table 23 Web Configurator Status Screen

LABEL	DESCRIPTION
Device Information	
System Name	This is the **System Name** you enter in the **Maintenance** > **System** > **General** screen. It is for identification purposes.
Firmware Version	This is the firmware version and the date created.
LAN Information	
- MAC Address	This shows the LAN Ethernet adapter MAC Address of your device.
- IP Address	This shows the LAN port’s IP address.
- IP Subnet Mask	This shows the LAN port’s subnet mask.
- DHCP	This shows the LAN port’s DHCP role - **Client** or **None**.
WLAN Information	
- MAC Address	This shows the wireless adapter MAC Address of your device.
- Status	This shows the current status of the Wireless LAN - **On**, **Off or Off by scheduler**.
- Name (SSID)	This shows a descriptive name used to identify the NBG-460N in the wireless LAN.
- Channel	This shows the channel number which you select manually.
- Operating Channel	This shows the channel number which the NBG-460N is currently using over the wireless LAN.
- Security Mode	This shows the level of wireless security the NBG-460N is using.
- 802.11 Mode	This shows the IEEE 802.11 standard that the NBG-460N supports. Wireless clients must support the same standard in order to be able to connect to the NBG-460N
- WPS	This shows the WPS (WiFi Protected Setup) Status. Click the status to display **Network** > **Wireless LAN** > **WPS** screen.
System Status	
System Uptime	This is the total time the NBG-460N has been on.
Current Date/Time	This field displays your NBG-460N’s present date and time.
System Resource	
- CPU Usage	This displays what percentage of the NBG-460N’s processing ability is currently used. When this percentage is close to 100%, the NBG-460N is running at full load, and the throughput is not going to improve anymore. If you want some applications to have more throughput, you should turn off other applications (for example, using bandwidth management).
- Memory Usage	This shows what percentage of the heap memory the NBG-460N is using. Heap memory refers to the memory that is not used by ZyNOS (ZyXEL Network Operating System) and is thus available for running processes like NAT and the firewall.
System Setting	
- Configuration Mode	This shows whether the advanced screens of each feature are turned on (**Advanced**) or not (**Basic**).
Interface Status	
Interface	This displays the NBG-460N port types. The port types are: **LAN** and **WLAN**.
Status	For the LAN port, this field displays **Down** (line is down) or **Up** (line is up or connected). For the WLAN, it displays **Up** when the WLAN is enabled or **Down** when the WLAN is disabled.

Table 23 Web Configurator Status Screen (continued)

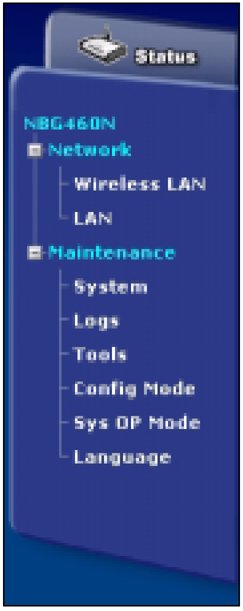
LABEL	DESCRIPTION
Rate	For the LAN ports, this displays the port speed and duplex setting or **N/A** when the line is disconnected. For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **N/A** when the WLAN is disabled.
Summary	
Packet Statistics	Use this screen to view port status and packet specific statistics.
WLAN Station Status	Use this screen to view the wireless stations that are currently associated to the NBG-460N.

5.3.1 Navigation Panel

Use the menu in the navigation panel to configure NBG-460N features in **AP Mode**.

The following screen and table show the features you can configure in **AP Mode**.

Figure 33 Menu: AP Mode



The following table describes the sub-menus.

Table 24 Screens Summary

LINK	TAB	FUNCTION
Status		This screen shows the NBG-460N’s general device, system and interface status information. Use this screen to access the wizard, and summary statistics tables.
Network		

Table 24 Screens Summary

LINK	TAB	FUNCTION
Wireless LAN	General	Use this screen to configure wireless LAN.
	MAC Filter	Use the MAC filter screen to configure the NBG-460N to block access to devices or block the devices from accessing the NBG-460N.
	Advanced	This screen allows you to configure advanced wireless settings.
	QoS	Use this screen to configure Wi-Fi Multimedia Quality of Service (WMM QoS). WMM QoS allows you to prioritize wireless traffic according to the delivery requirements of individual services.
	WPS	Use this screen to configure WPS.
	WPS Station	Use this screen to add a wireless station using WPS.
	Scheduling	Use this screen to schedule the times the Wireless LAN is enabled.
LAN	IP	Use this screen to configure LAN IP address and subnet mask or to get the LAN IP address from a DHCP server.
Maintenance		
System	General	Use this screen to view and change administrative settings such as system and domain names, password and inactivity timer.
	Time Setting	Use this screen to change your NBG-460N’s time and date.
Logs	View Log	Use this screen to view the logs for the categories that you selected.
	Log Settings	Use this screen to change your NBG-460N’s log settings.
Tools	Firmware	Use this screen to upload firmware to your NBG-460N.
	Configuration	Use this screen to backup and restore the configuration or reset the factory defaults to your NBG-460N.
	Restart	This screen allows you to reboot the NBG-460N without turning the power off.
	Wake On LAN	Use this screen to remotely turn on a device on the network.
Config Mode	General	This screen allows you to display or hide the advanced screens or features.
Sys OP Mode	General	This screen allows you to select whether your device acts as a Router or a Access Point.
Language		This screen allows you to select the language you prefer.

5.4 Configuring Your Settings

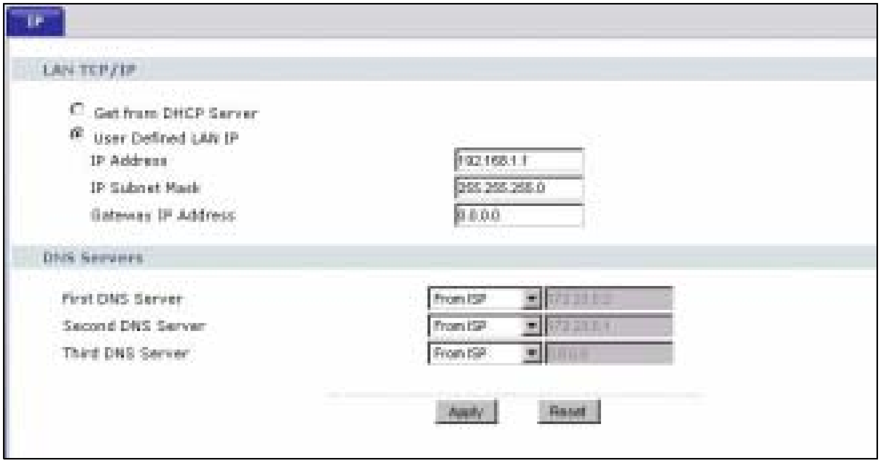
5.4.1 LAN Settings

Use this section to configure your LAN settings while in **AP Mode**.

Click **Network > LAN** to see the screen below.

If you change the IP address of the NBG-460N in the screen below, you will need to log into the NBG-460N again using the new IP address.

Figure 34 Network > LAN > IP



LAN TCP/IP

○ Get from DHCP Server
● User Defined LAN IP
IP Address: 192.168.1.1
IP Subnet Mask: 255.255.255.0
Gateway IP Address: 0.0.0.0

DNS Servers

First DNS Server: From ISP 172.23.5.2
Second DNS Server: From ISP 172.23.5.1
Third DNS Server: From ISP 0.0.0.0

The table below describes the labels in the screen.

Table 25 Network > LAN > IP

LABEL	DESCRIPTION
Get from DHCP Server	Select this option to allow the NBG-460N to obtain an IP address from a DHCP server on the network. You must connect the WAN port to a device with a DHCP server enabled (such as a router or gateway). Without a DHCP server the NBG-460N will have no IP address. You need to find out the IP address the DHCP server assigns to the NBG-460N and use that address to log in to the NBG-460N again.
User Defined LAN IP	Select this option to set the NBG-460N's IP address. This setting is selected by default. Check the IP address is on the same domain as other devices on your network.
IP Address	Type the IP address in dotted decimal notation. The default setting is 192.168.1.1. If you change the IP address you will have to log in again with the new IP address.
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your NBG-460N will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the NBG-460N.
Gateway IP Address	Type the IP address of the gateway. The gateway is an immediate neighbor of your NBG-460N that will forward the packet to the destination. In **AP Mode**, the gateway must be a router on the same segment as your NBG-460N.
DNS Servers	
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information. The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

5.4.2 WLAN and Maintenance Settings

The configuration of wireless and maintenance settings in **AP Mode** is the same as for **Router Mode**.

- See Chapter 5 on page 69 for information on the configuring your wireless network.
- See Maintenance and Troubleshooting (227) for information on the configuring your Maintenance settings.

5.5 Logging in to the Web Configurator in AP Mode

1. Connect your computer to the LAN port of the NBG-460N.
2. The default IP address if the NBG-460N is “192.168.1.1”. In this case, your computer must have an IP address in the range between “192.168.1.2” and “192.168.1.255”.
3. Click **Start** > **Run** on your computer in Windows.
4. Type “cmd” in the dialog box.
5. Type “ipconfig” to show your computer’s IP address. If your computer’s IP address is not in the correct range then see Appendix D on page 293 for information on changing your computer’s IP address.
6. After you’ve set your computer’s IP address, open a web browser such as Internet Explorer and type “192.168.1.1” as the web address in your web browser.

See Chapter 6 on page 73 for a tutorial on setting up a network with an AP.

6

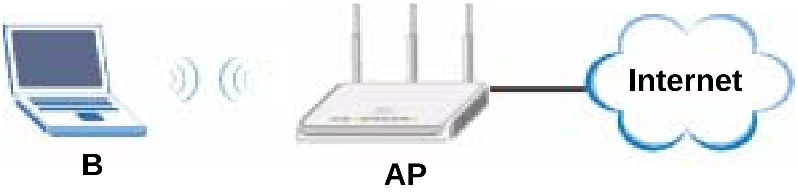
Tutorials

6.1 Wireless Tutorials

6.1.1 How to Connect to the Internet from an AP

This section gives you an example of how to set up an access point (**AP**) and wireless client (a notebook (**B**), in this example) for wireless communication. **B** can access the Internet through the AP wirelessly.

Figure 35 Wireless AP Connection to the Internet



6.1.2 Configure Wireless Security Using WPS on both your NBG-460N and Wireless Client

This section gives you an example of how to set up wireless network using WPS. This example uses the NBG-460N as the AP and NWD210N as the wireless client which connects to a notebook.

The wireless client must be a WPS-aware device (for example, a WPS USB adapter or PCI card).

There are two WPS methods for creating a secure connection. This tutorial shows you how to do both.

- **Push Button Configuration (PBC)** - create a secure wireless network simply by pressing a button. See Section 6.1.2.1 on page 74.This is the easier method.
- **PIN Configuration** - create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the NBG-460N's interface. See Section 6.1.2.2 on page 75. This is the more secure method, since one device can authenticate the other.

6.1.2.1 Push Button Configuration (PBC)

1 Make sure that your NBG-460N is turned on and that it is within range of your computer.

2 Make sure that you have installed the wireless client (this example uses the NWD210N) driver and utility in your notebook.

3 In the wireless client utility, find the WPS settings. Enable WPS and press the WPS button (**Start** or **WPS** button)

4 Log into NBG-460N's web configurator and press the **Push Button** button in the **Network** > **Wireless Client** > **WPS Station** screen.

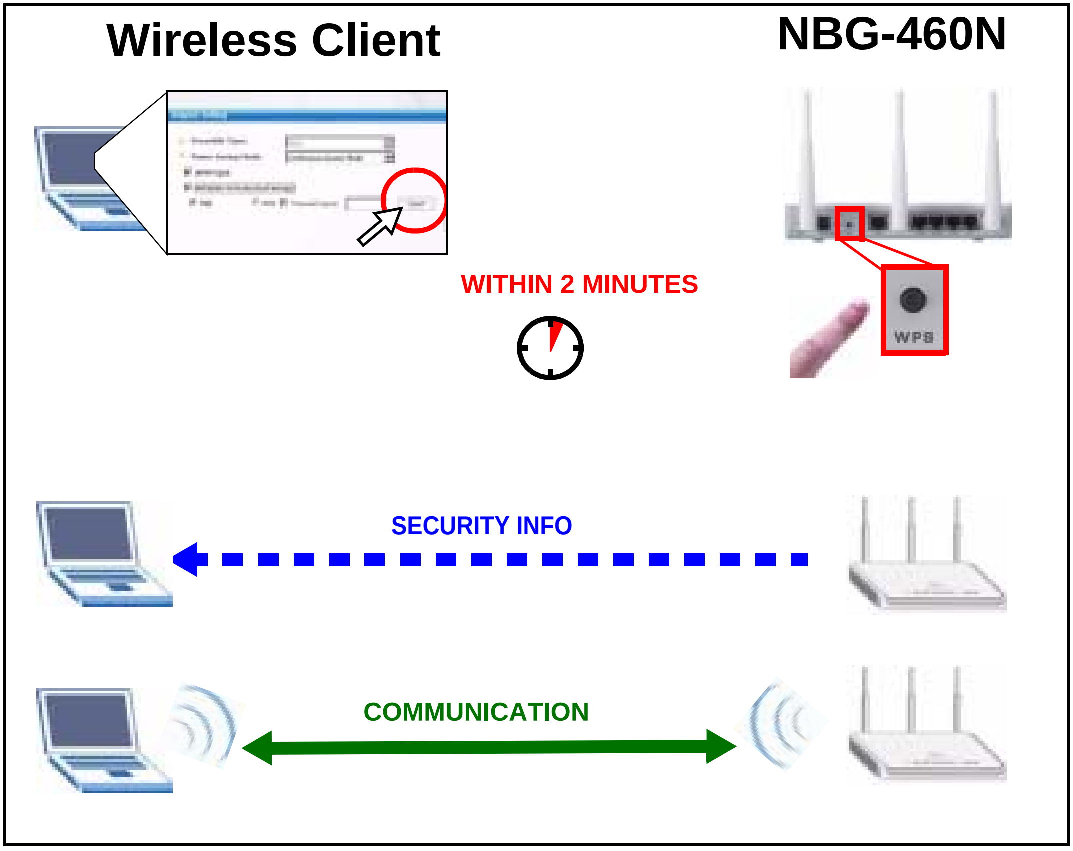
Your NBG-460N has a WPS button located on its panel, as well as a WPS button in its configuration utility. Both buttons have exactly the same function; you can use one or the other.

It doesn't matter which button is pressed first. You must press the second button within two minutes of pressing the first one.

The NBG-460N sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG-460N securely.

The following figure shows you an example to set up wireless network and security by pressing a button on both NBG-460N and wireless client (the NWD210N in this example).

Figure 36 Example WPS Process: PBC Method



6.1.2.2 PIN Configuration

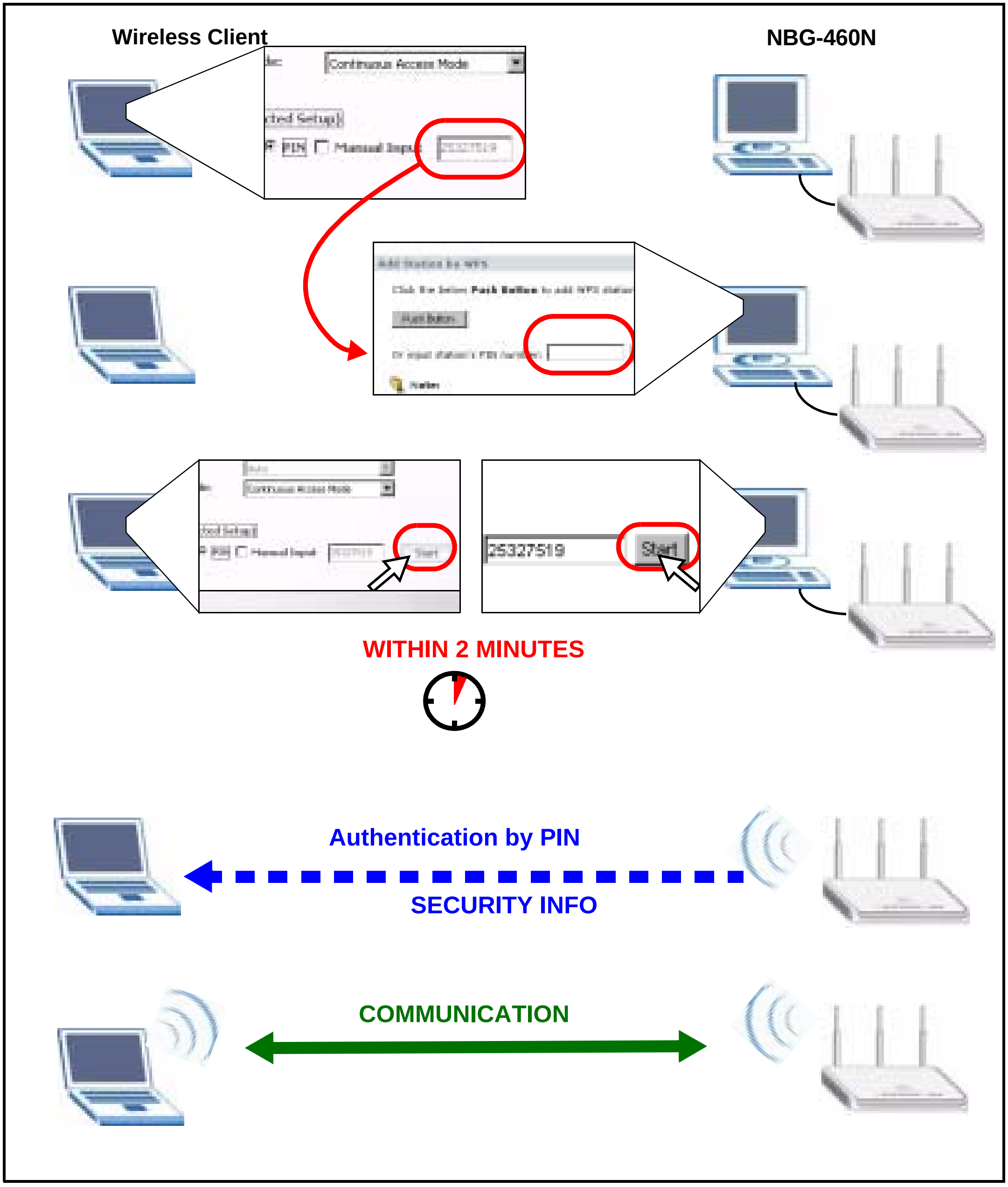
When you use the PIN configuration method, you need to use both NBG-460N's configuration interface and the client's utilities.

1. Launch your wireless client's configuration utility. Go to the WPS settings and select the PIN method to get a PIN number.
2. Enter the PIN number to the **PIN** field in the **Network** > **Wireless LAN** > **WPS Station** screen on the NBG-460N.
3. Click **Start** buttons (or button next to the PIN field) on both the wireless client utility screen and the NBG-460N's **WPS Station** screen within two minutes.

The NBG-460N authenticates the wireless client and sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the NBG-460N securely.

The following figure shows you the example to set up wireless network and security on NBG-460N and wireless client (ex. NWD210N in this example) by using PIN method.

Figure 37 Example WPS Process: PIN Method



6.1.3 Enable and Configure Wireless Security without WPS on your NBG-460N

This example shows you how to configure wireless security settings with the following parameters on your NBG-460N.

SSID	SSID_Example3

Channel	6
Security	WPA-PSK (Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey)

Follow the steps below to configure the wireless settings on your NBG-460N.

The instructions require that your hardware is connected (see the Quick Start Guide) and you are logged into the web configurator through your LAN connection (see Section 3.2 on page 37).

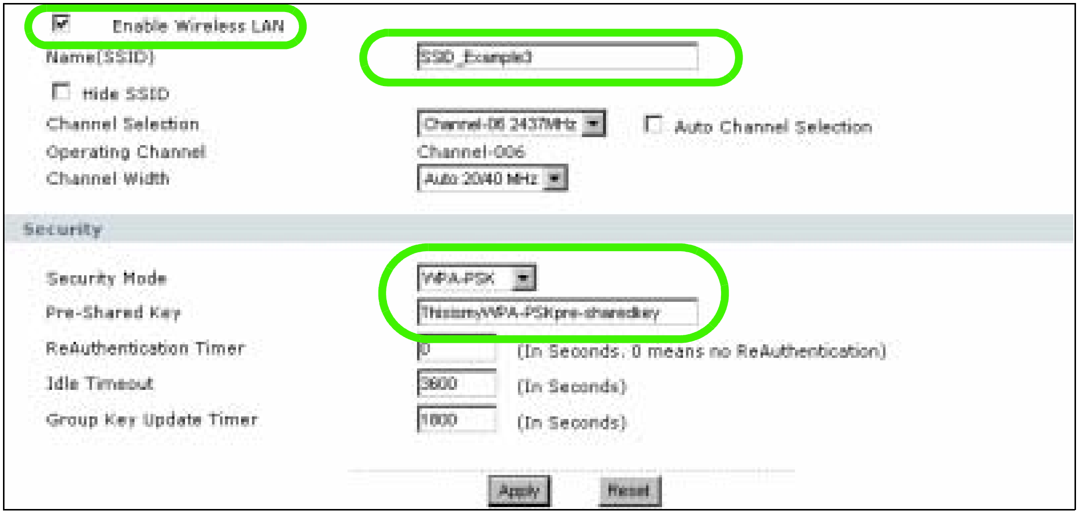
1 Open the **Wireless LAN** > **General** screen in the AP’s web configurator.

2 Make sure the **Enable Wireless LAN** check box is selected.

3 Enter **SSID_Example3** as the SSID and select a channel.

4 Set security mode to **WPA-PSK** and enter **ThisismyWPA-PSKpre-sharedkey** in the **Pre-Shared Key** field. Click **Apply**.

Figure 38 Network > Wireless LAN > General



☑ Enable Wireless LAN

Name(SSID) SSID_Example3

□ Hide SSID

Channel Selection Channel-06 2437MHz □ Auto Channel Selection

Operating Channel Channel-006

Channel Width Auto 20/40 MHz

Security

Security Mode WPA-PSK

Pre-Shared Key ThisismyWPA-PSKpre-sharedkey

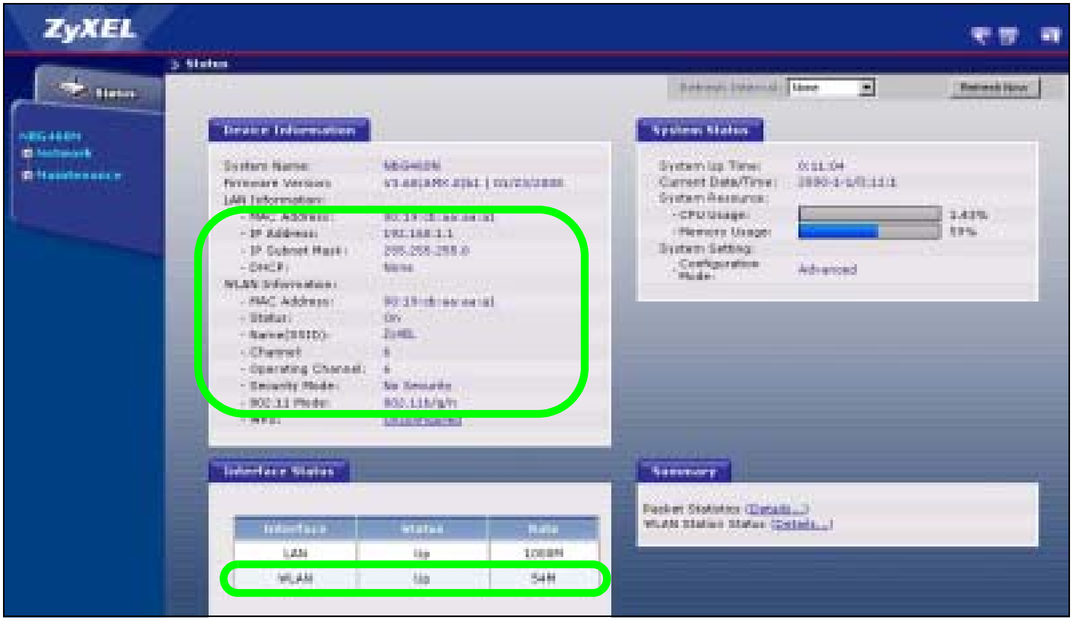
ReAuthentication Timer 0 (In Seconds, 0 means no ReAuthentication)

Idle Timeout 3600 (In Seconds)

Group Key Update Timer 1800 (In Seconds)

5 Open the **Status** screen. Verify your wireless and wireless security settings under **Device Information** and check if the WLAN connection is up under **Interface Status**.

Figure 39 Status: AP Mode



System Name:	NBG460N
Firmware Version:	V1.00(AMX.0)b1 | 01/23/2008
LAN Information:	
- MAC Address:	00:19:cb:aa:aa:a1
- IP Address:	192.168.1.1
- IP Subnet Mask:	255.255.255.0
- DHCP:	None
WLAN Information:	
- MAC Address:	00:19:cb:aa:aa:a1
- Status:	On
- Name(SSID):	ZyXEL
- Channel:	6
- Operating Channel:	6
- Security Mode:	No Security
- 802.11 Mode:	802.11b/g/n
- WPS:	[illegible]

System Up Time:	0:11:04
Current Date/Time:	2000-1-1/0:11:1
System Resource:	
- CPU Usage:	1.43%
- Memory Usage:	57%
System Setting:	
- Configuration Mode:	Advanced

Interface	Status	Rate
LAN	Up	100M
WLAN	Up	54M

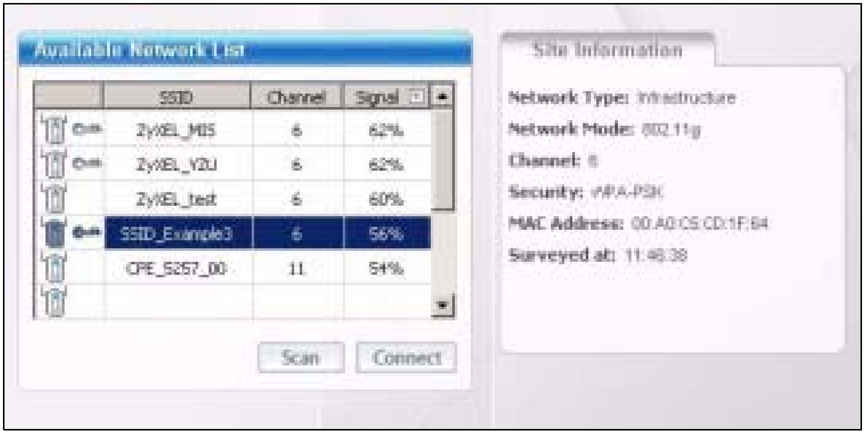
Packet Statistics: (Details...)
WLAN Station Status: (Details...)

6.1.4 Configure Your Notebook

We use the ZyXEL M-302 wireless adapter utility screens as an example for the wireless client. The screens may vary for different models.

1. The NBG-460N supports IEEE 802.11b, IEEE 802.11g and IEEE 802.11n wireless clients. Make sure that your notebook or computer’s wireless adapter supports one of these standards.
2. Wireless adapters come with software sometimes called a “utility” that you install on your computer. See your wireless adapter’s User’s Guide for information on how to do that.
3. After you’ve installed the utility, open it. If you cannot see your utility’s icon on your screen, go to **Start** > **Programs** and click on your utility in the list of programs that appears. The utility displays a list of APs within range, as shown in the example screen below.
4. Select SSID_Example3 and click **Connect**.

Figure 40 Connecting a Wireless Client to a Wireless Network t



Available Network List

	SSID	Channel	Signal
	ZyXEL_MIS	6	62%
	ZyXEL_Y2U	6	62%
	ZyXEL_test	6	60%
	SSID_Example3	6	56%
	CPE_5257_00	11	54%

Site Information

Network Type: Infrastructure

Network Mode: 802.11g

Channel: 6

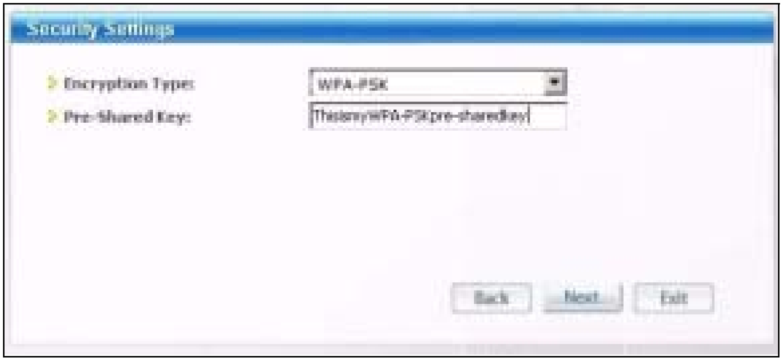
Security: WPA-PSK

MAC Address: 00:A0:C5:CD:1F:64

Surveyed at: 11:46:38

5 Select WPA-PSK and type the security key in the following screen. Click **Next**.

Figure 41 Security Settings



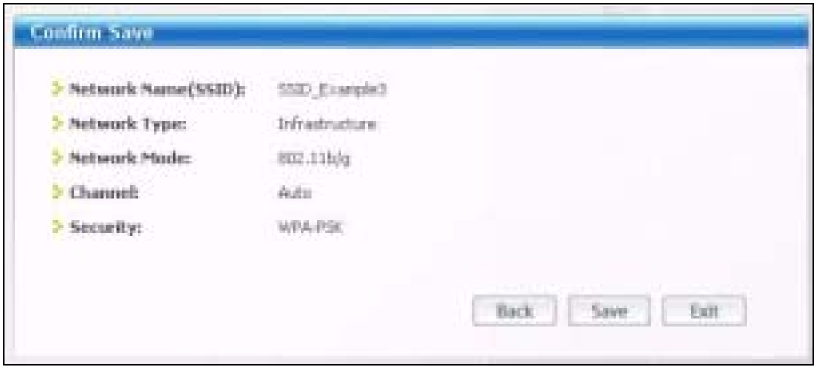
Security Settings

Encryption Type: WPA-PSK

Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey

6 The **Confirm Save** window appears. Check your settings and click **Save** to continue.

Figure 42 Confirm Save



Confirm Save

Network Name(SSID): SSID_Example3

Network Type: Infrastructure

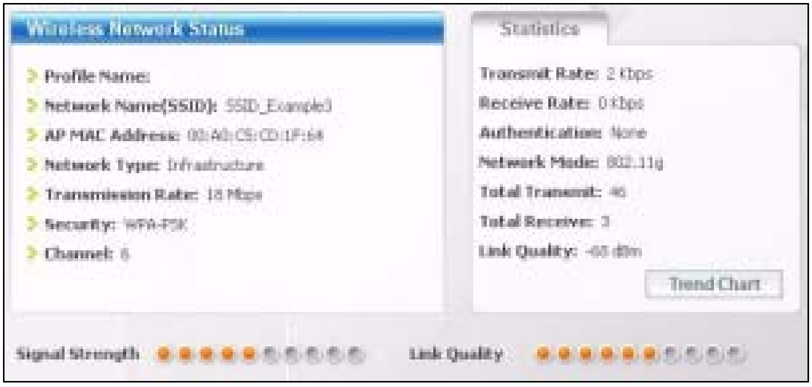
Network Mode: 802.11b/g

Channel: Auto

Security: WPA-PSK

7 Check the status of your wireless connection in the screen below. If your wireless connection is weak or you have no connection, see the Troubleshooting section of this User’s Guide.

Figure 43 Link Status



Wireless Network Status

- Profile Name:
- Network Name(SSID): SSID_Example3
- AP MAC Address: 00:A0:C5:CD:1F:64
- Network Type: Infrastructure
- Transmission Rate: 18 Mbps
- Security: WPA-PSK
- Channel: 6

Statistics

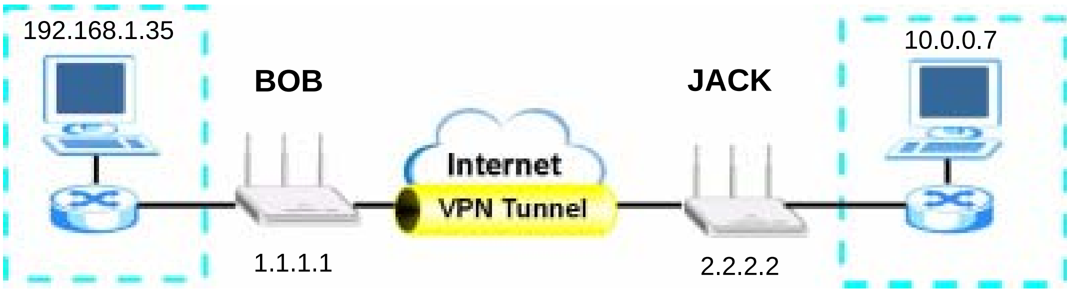
Transmit Rate: 2 Kbps
Receive Rate: 0 Kbps
Authentication: None
Network Mode: 802.11g
Total Transmit: 46
Total Receive: 3
Link Quality: -65 dBm

8 If your connection is successful, open your Internet browser and enter http://www.zyxel.com or the URL of any other web site in the address bar. If you are able to access the web site, your wireless connection is successfully configured.

6.2 Site-To-Site VPN Tunnel Tutorial

Bob and Jack want to setup a VPN connection between their offices. Bob and Jack each have a NBG-460N router and a static WAN IP address. This tutorial covers how to configure their NBG-460Ns to create a secure connection.

Figure 44 Site-To-Site VPN Tunnel



The following table describes the VPN settings that must be configured on Bob and Jack's NBG-460N routers.

Table 26 Site-To-Site VPN Tunnel Settings

SETTING	BOB'S NBG-460N	JACK'S NBG-460N
Active	YES	YES
IPSec Keying Mode	IKE	IKE
Local Address	192.168.1.35	10.0.0.7
Local Address End /Mask	192.168.1.35	10.0.0.7
Remote Address	10.0.0.7	192.168.1.35
Remote Address End /Mask	10.0.0.7	192.168.1.35
My IP Address	1.1.1.1	2.2.2.2

Table 26 Site-To-Site VPN Tunnel Settings (continued)

SETTING	BOB'S NBG-460N	JACK'S NBG-460N
Local ID Type	IP	IP
Local Content	1.1.1.1	2.2.2.2
Secure Gateway Address	2.2.2.2	1.1.1.1
Peer ID Type	IP	IP
Peer Content	2.2.2.2	1.1.1.1
Encapsulation Mode	Tunnel	Tunnel
IPSec Protocol	ESP	ESP
Pre-Shared Key	ThisIsMySecretKey	ThisIsMySecretKey
Encryption Algorithm	3DES	3DES
Authentication Algorithm	SHA1	SHA1

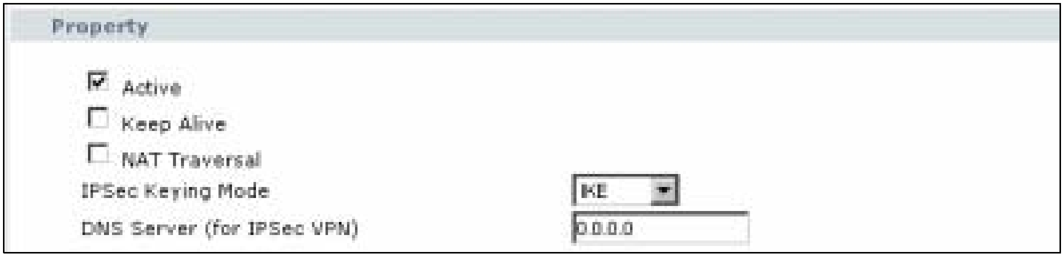
6.2.1 Configuring Bob's NBG-460N VPN Settings

To configure these settings Bob uses the NBG-460N web configurator.

1 Log into the NBG-460N web configurator and click **VPN** > **Modify** icon. This displays the **VPN Rule Setup** (basic) screen.

2 Select the **Active** checkbox to enable the VPN rule after it has been created. Make sure IKE is selected as the **IPSec Keying Mode**.

Figure 45 Property



Property

☑ Active

☐ Keep Alive

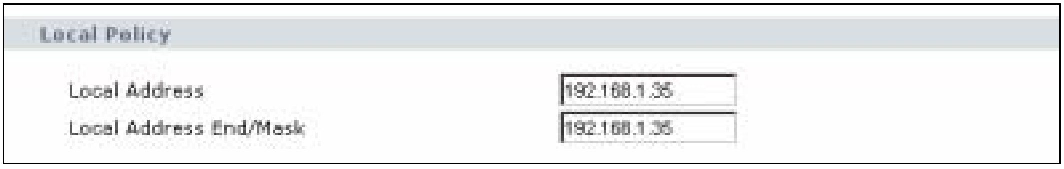
☐ NAT Traversal

IPSec Keying Mode: IKE

DNS Server (for IPSec VPN): 0.0.0.0

3 Enter the IP address "192.168.1.35" in the **Local Address** text box. This is the IP address of Bob's computer. Enter the IP address "192.168.1.35" in the **Local Address End/Mask** text box. This value is the same as Bob only wants Jack to access this single IP address.

Figure 46 Local Policy



Local Policy

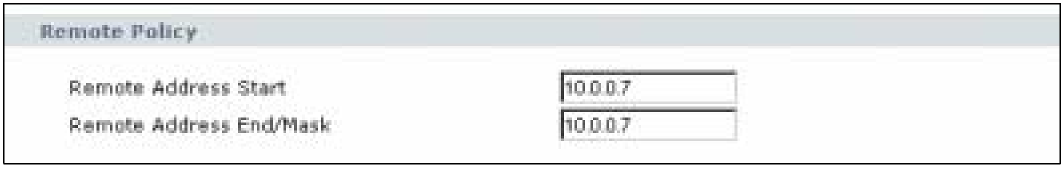
Local Address: 192.168.1.35

Local Address End/Mask: 192.168.1.35

4 Enter the IP address "10.0.0.7" in the **Remote Address Start** text box. This is the IP address of Jack's computer. Enter the IP address "10.0.0.7" in the **Remote Address**

End/Mask text box. This value is the same as Jack only wants Bob to access this single IP address.

Figure 47 Remote Policy



Remote Policy

Remote Address Start	10.0.0.7
Remote Address End/Mask	10.0.0.7

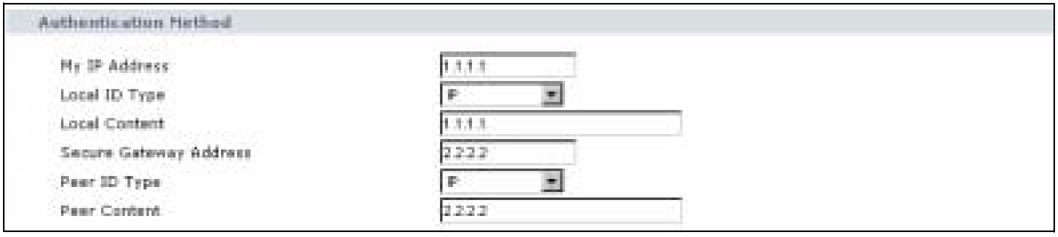
5 Enter the IP address “1.1.1.1” in the **My IP Address** text box. This is Bob’s WAN IP address.

6 Select IP as the **Local ID Type**. This is the type of content that will be used to identify Bob’s NBG-460N. Enter the IP address “1.1.1.1” in the **Local Content** text box. This identifies Bob’s NBG-460N to Jack’s NBG-460N.

7 Enter the IP address “2.2.2.2” in the **Secure Gateway Address** text box. This is Jack’s WAN IP address.

8 Select IP as the **Peer ID Type**. This is Jack’s **Local ID Type**. Enter “2.2.2.2” in the **Peer Content** text box. This is Jack’s **Local Content** WAN IP address.

Figure 48 Authentication Method



Authentication Method

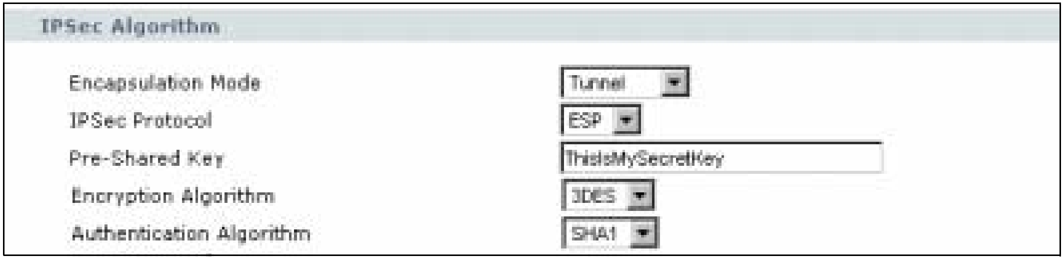
My IP Address	1.1.1.1
Local ID Type	IP
Local Content	1.1.1.1
Secure Gateway Address	2.2.2.2
Peer ID Type	IP
Peer Content	2.2.2.2

9 Select **Tunnel** as the **Encapsulation Mode** and **ESP** as the **IPSec Protocol**.

10 Enter “ThisIsMySecretKey” as the **Pre-Shared Key**. This is the password for the VPN tunnel that only Bob and Jack know.

11 Select **3DES** as the encyption algorithm. Select the authentication algorithm as **SHA1**. These algorithms are more secure.

Figure 49 IPSec Algorithm

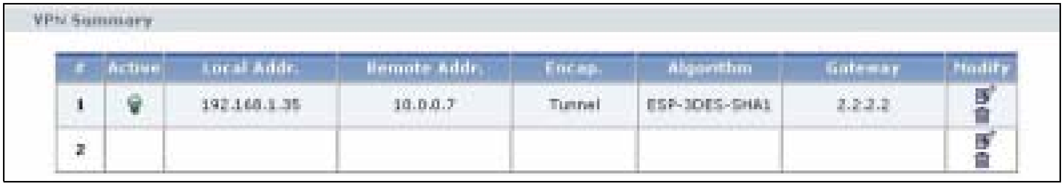


IPSec Algorithm

Encapsulation Mode	Tunnel
IPSec Protocol	ESP
Pre-Shared Key	ThisIsMySecretKey
Encryption Algorithm	3DES
Authentication Algorithm	SHA1

12 Click **Apply** to save the new rule and click **VPN** to return to the **VPN Summary** screen. The new VPN rule is displayed as shown below.

Figure 50 VPN Summary



VPN Summary

#	Active	Local Addr.	Remote Addr.	Encap.	Algorithm	Gateway	Modify
1	●	192.168.1.35	10.0.0.7	Tunnel	ESP-3DES-SHA1	2.2.2.2	
2							

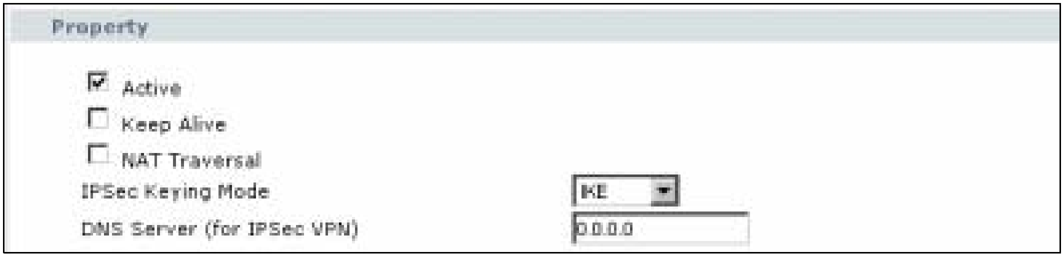
6.2.2 Configuring Jack's NBG-460N VPN Settings

To configure these settings Jack uses the NBG-460N web configurator.

1 Log into the NBG-460N web configurator and click **VPN** > **Modify** icon. This displays the **VPN Rule Setup** (basic) screen.

2 Select the **Active** checkbox to enable the VPN rule after it has been created. Make sure IKE is selected as the **IPSec Keying Mode**.

Figure 51 Property



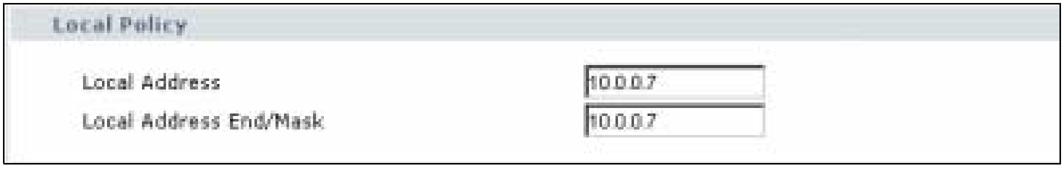
Property

☑ Active
☐ Keep Alive
☐ NAT Traversal

IPSec Keying Mode: IKE
DNS Server (for IPSec VPN): 0.0.0.0

3 Enter the IP address "10.0.0.7" in the **Local Address** text box. This is the IP address of Jack's computer. Enter the IP address "10.0.0.7" in the **Local Address End/Mask** text box. This value is the same as Jack only wants Bob to access this single IP address.

Figure 52 Local Policy

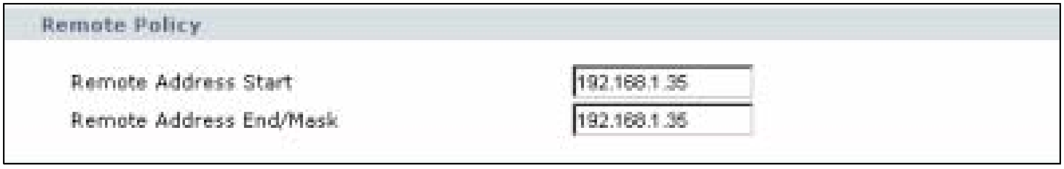


Local Policy

Local Address: 10.0.0.7
Local Address End/Mask: 10.0.0.7

4 Enter the IP address "192.168.1.35" in the **Remote Address Start** text box. This is the IP address of Jack's computer. Enter the IP address "192.168.1.35" in the **Remote Address End/Mask** text box. This value is the same as Bob only wants Jack to access this single IP address.

Figure 53 Remote Policy



Remote Policy

Remote Address Start: 192.168.1.35
Remote Address End/Mask: 192.168.1.35

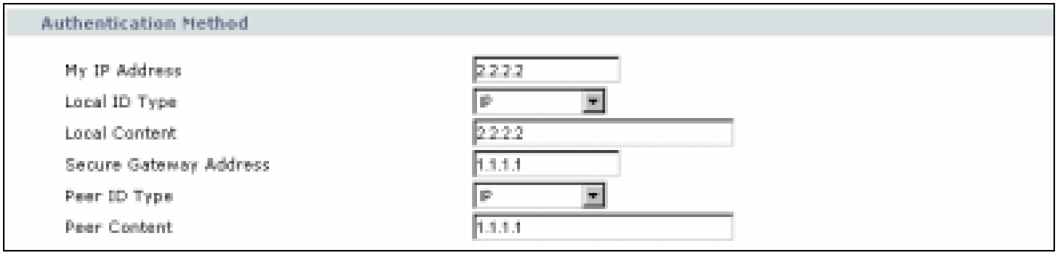
5 Enter the IP address "2.2.2.2" in the **My IP Address** text box. This is Jack's WAN IP address.

6 Select IP as the **Local ID Type**. This is the type of content that will be used to identify Jack’s NBG-460N. Enter the IP address “2.2.2.2” in the **Local Content** text box. This identifies Jack’s NBG-460N to Bob’s NBG-460N.

7 Enter the IP address “1.1.1.1” in the **Secure Gateway Address** text box. This is Bob’s WAN IP address.

8 Select IP as the **Peer ID Type**. This is Bob’s **Local ID Type**. Enter “1.1.1.1” in the **Peer Content** text box. This is Bob’s **Local Content** WAN IP address.

Figure 54 Authentication Method



Authentication Method

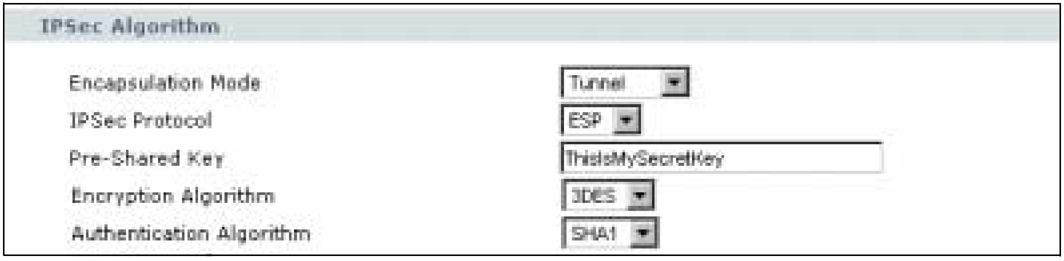
My IP Address	2.2.2.2
Local ID Type	IP
Local Content	2.2.2.2
Secure Gateway Address	1.1.1.1
Peer ID Type	IP
Peer Content	1.1.1.1

9 Select **Tunnel** as the **Encapsulation Mode** and **ESP** as the **IPSec Protocol**.

10 Enter “ThisIsMySecretKey” as the **Pre-Shared Key**. This is the password for the VPN tunnel that only Bob and Jack know.

11 Select **3DES** as the encyption algorithm. Select the authentication algorithm as **SHA1**. These algorithms are more secure.

Figure 55 IPSec Algorithm

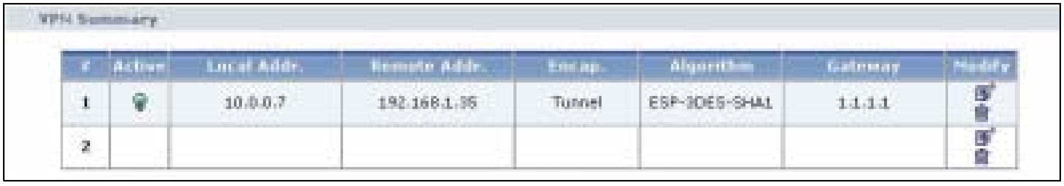


IPSec Algorithm

Encapsulation Mode	Tunnel
IPSec Protocol	ESP
Pre-Shared Key	ThisIsMySecretKey
Encryption Algorithm	3DES
Authentication Algorithm	SHA1

12 Click **Apply** to save the new rule and click **VPN** in the web configurator menu to return to the **VPN Summary** screen. The new VPN rule is displayed as shown below.

Figure 56 VPN Summary



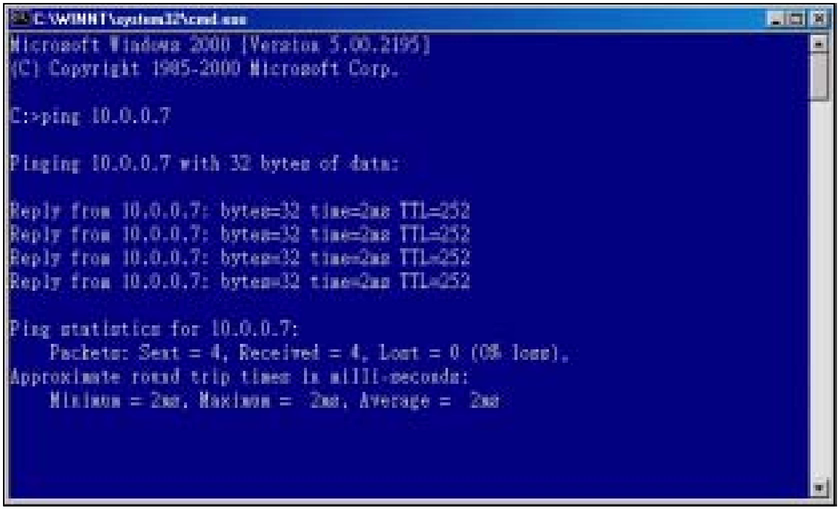
VPN Summary

#	Active	Local Addr.	Remote Addr.	Encap.	Algorithm	Gateway	Modify
1	●	10.0.0.7	192.168.1.35	Tunnel	ESP-3DES-SHA1	1.1.1.1	
2							

6.2.3 Checking the VPN Connection

Check if the VPN connection is working by pinging the computer on the other side of the VPN connection. In the example below Bob is pinging Jack’s computer.

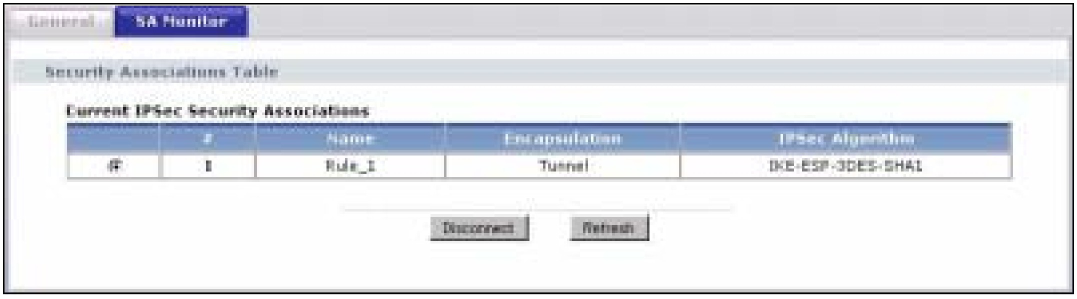
Figure 57 Pinging Jack's Local IP Address



```
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:>ping 10.0.0.7

Pinging 10.0.0.7 with 32 bytes of data:

Reply from 10.0.0.7: bytes=32 time=2ms TTL=252
Reply from 10.0.0.7: bytes=32 time=2ms TTL=252
Reply from 10.0.0.7: bytes=32 time=2ms TTL=252
Reply from 10.0.0.7: bytes=32 time=2ms TTL=252

Ping statistics for 10.0.0.7:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum =  2ms, Average =  2ms
```

Pinging is successful which means a VPN tunnel has been established between Bob and Jack's NBG-460Ns. Congratulations! To check this VPN connection click **VPN** > **SA Monitor** in the web configurator.

Figure 58 SA Monitor



Security Associations Table

Current IPSec Security Associations

	#	Name	Encapsulation	IPSec Algorithm
	1	Rule_1	Tunnel	IKE-ESP-3DES-SHA1

?

If pinging is not successful check the VPN settings on both devices and try again. If you are still having problems make sure the VPN settings in the Advanced options are also the same.

For more information on VPN including field descriptions refer to Chapter 15 on page 165.

PART II
Network

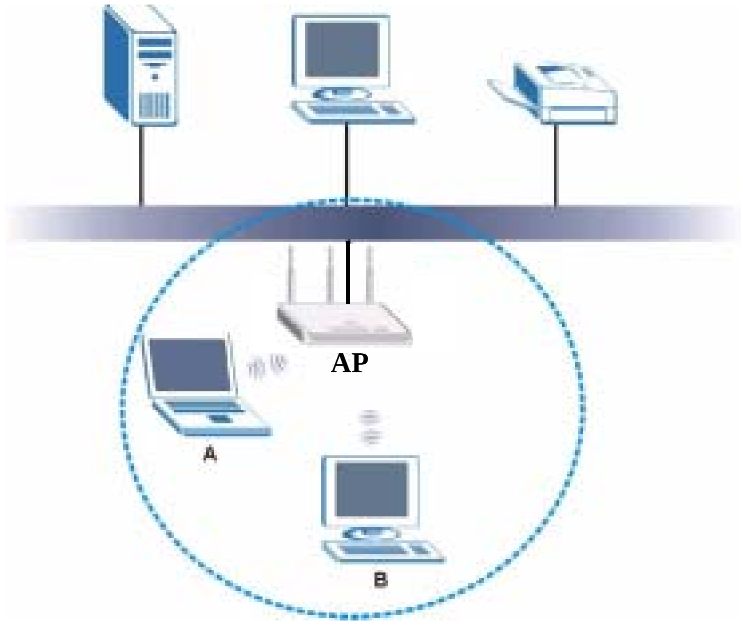
Wireless LAN

This chapter discusses how to configure the wireless network settings in your NBG-460N. See the appendices for more detailed information about wireless networks.

7.1 Wireless Network Overview

The following figure provides an example of a wireless network.

Figure 59 Example of a Wireless Network



The wireless network is the part in the blue circle. In this wireless network, devices A and B are called wireless clients. The wireless clients use the access point (AP) to interact with other devices (such as the printer) or with the Internet. Your NBG-460N is the AP.

Every wireless network must follow these basic guidelines.

- Every wireless client in the same wireless network must use the same SSID.

  The SSID is the name of the wireless network. It stands for Service Set IDentity.
- If two wireless networks overlap, they should use different channels.

  Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.

- Every wireless client in the same wireless network must use security compatible with the AP.

  Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network.

7.2 Wireless Security Overview

The following sections introduce different types of wireless security you can set up in the wireless network.

7.2.1 SSID

Normally, the AP acts like a beacon and regularly broadcasts the SSID in the area. You can hide the SSID instead, in which case the AP does not broadcast the SSID. In addition, you should change the default SSID to something that is difficult to guess.

This type of security is fairly weak, however, because there are ways for unauthorized devices to get the SSID. In addition, unauthorized devices can still see the information that is sent in the wireless network.

7.2.2 MAC Address Filter

Every wireless client has a unique identification number, called a MAC address.[1] A MAC address is usually written using twelve hexadecimal characters[2]; for example, 00A0C5000002 or 00:A0:C5:00:00:02. To get the MAC address for each wireless client, see the appropriate User’s Guide or other documentation.

You can use the MAC address filter to tell the AP which wireless clients are allowed or not allowed to use the wireless network. If a wireless client is allowed to use the wireless network, it still has to have the correct settings (SSID, channel, and security). If a wireless client is not allowed to use the wireless network, it does not matter if it has the correct settings.

This type of security does not protect the information that is sent in the wireless network. Furthermore, there are ways for unauthorized devices to get the MAC address of an authorized wireless client. Then, they can use that MAC address to use the wireless network.

7.2.3 User Authentication

You can make every user log in to the wireless network before they can use it. This is called user authentication. However, every wireless client in the wireless network has to support IEEE 802.1x to do this.

For wireless networks, there are two typical places to store the user names and passwords for each user.

- In the AP: this feature is called a local user database or a local database.
- In a RADIUS server: this is a server used in businesses more than in homes.

[1] Some wireless devices, such as scanners, can detect wireless networks but cannot use wireless networks. These kinds of wireless devices might not have MAC addresses.

[2] Hexadecimal characters are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

If your AP does not provide a local user database and if you do not have a RADIUS server, you cannot set up user names and passwords for your users.

Unauthorized devices can still see the information that is sent in the wireless network, even if they cannot use the wireless network. Furthermore, there are ways for unauthorized wireless users to get a valid user name and password. Then, they can use that user name and password to use the wireless network.

Local user databases also have an additional limitation that is explained in the next section.

7.2.4 Encryption

Wireless networks can use encryption to protect the information that is sent in the wireless network. Encryption is like a secret code. If you do not know the secret code, you cannot understand the message.

The types of encryption you can choose depend on the type of user authentication. (See Section 7.2.3 on page 90 for information about this.)

Table 27 Types of Encryption for Each Type of Authentication

	NO AUTHENTICATION	RADIUS SERVER
Weakest	No Security	WPA
↕	Static WEP	
	WPA-PSK	
Strongest	WPA2-PSK	WPA2

For example, if the wireless network has a RADIUS server, you can choose **WPA** or **WPA2**. If users do not log in to the wireless network, you can choose no encryption, **Static WEP**, **WPA-PSK**, or **WPA2-PSK**.

Usually, you should set up the strongest encryption that every wireless client in the wireless network supports. For example, suppose the AP does not have a local user database, and you do not have a RADIUS server. Therefore, there is no user authentication. Suppose the wireless network has two wireless clients. Device A only supports WEP, and device B supports WEP and WPA. Therefore, you should set up **Static WEP** in the wireless network.

It is recommended that wireless networks use **WPA-PSK**, **WPA**, or stronger encryption. IEEE 802.1x and WEP encryption are better than none at all, but it is still possible for unauthorized devices to figure out the original information pretty quickly.

It is not possible to use **WPA-PSK**, **WPA** or stronger encryption with a local user database. In this case, it is better to set up stronger encryption with no authentication than to set up weaker encryption with the local user database.

When you select **WPA2** or **WPA2-PSK** in your NBG-460N, you can also select an option (**WPA Compatible**) to support WPA as well. In this case, if some wireless clients support WPA and some support WPA2, you should set up **WPA2-PSK** or **WPA2** (depending on the type of wireless network login) and select the **WPA Compatible** option in the NBG-460N.

Many types of encryption use a key to protect the information in the wireless network. The longer the key, the stronger the encryption. Every wireless client in the wireless network must have the same key.

7.3 Roaming

A wireless station is a device with an IEEE 802.11a/b/g/n compliant wireless interface. An access point (AP) acts as a bridge between the wireless and wired networks. An AP creates its own wireless coverage area. A wireless station can associate with a particular access point only if it is within the access point’s coverage area.

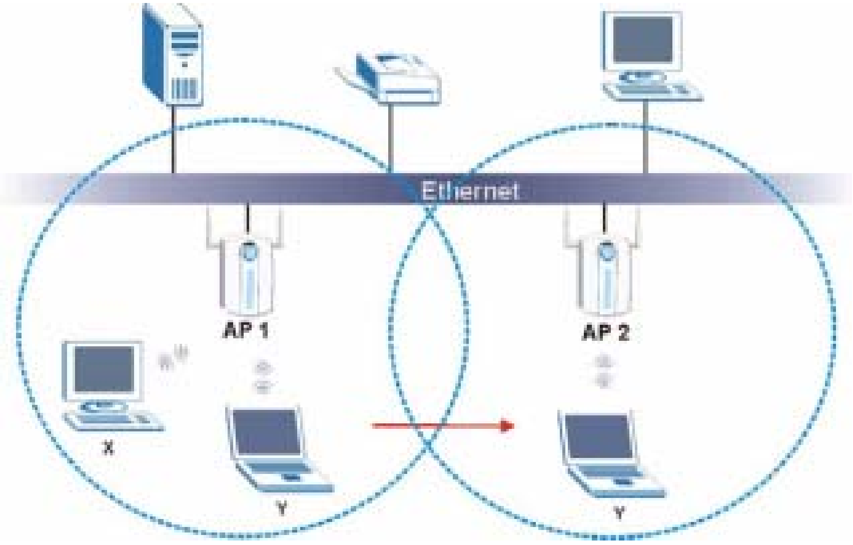
In a network environment with multiple access points, wireless stations are able to switch from one access point to another as they move between the coverage areas. This is known as roaming. As the wireless station moves from place to place, it is responsible for choosing the most appropriate access point depending on the signal strength, network utilization or other factors.

The roaming feature on the access points allows the access points to relay information about the wireless stations to each other. When a wireless station moves from a coverage area to another, it scans and uses the channel of a new access point, which then informs the other access points on the LAN about the change. An example is shown in Figure 60 on page 93.

With roaming, a wireless LAN mobile user enjoys a continuous connection to the wired network through an access point while moving around the wireless LAN.

Enable roaming to exchange the latest bridge information of all wireless stations between APs when a wireless station moves between coverage areas. Wireless stations can still associate with other APs even if you disable roaming. Enabling roaming ensures correct traffic forwarding (bridge tables are updated) and maximum AP efficiency. The AP deletes records of wireless stations that associate with other APs (Non-ZyXEL APs may not be able to perform this). 802.1x authentication information is not exchanged (at the time of writing).

Figure 60 Roaming Example



The steps below describe the roaming process.

1. Wireless station **Y** moves from the coverage area of access point **AP 1** to that of access point **AP 2**.
2. Wireless station **Y** scans and detects the signal of access point **AP 2**.
3. Wireless station **Y** sends an association request to access point **AP 2**.
4. Access point **AP 2** acknowledges the presence of wireless station **Y** and relays this information to access point **AP 1** through the wired LAN.
5. Access point **AP 1** updates the new position of wireless station **Y**.

7.3.1 Requirements for Roaming

The following requirements must be met in order for wireless stations to roam between the coverage areas.

1. All the access points must be on the same subnet and configured with the same ESSID.
2. If IEEE 802.1x user authentication is enabled and to be done locally on the access point, the new access point must have the user profile for the wireless station.
3. The adjacent access points should use different radio channels when their coverage areas overlap.
4. All access points must use the same port number to relay roaming information.
5. The access points must be connected to the Ethernet and be able to get IP addresses from a DHCP server if using dynamic IP address assignment.

7.4 Quality of Service

This section discusses the Quality of Service (QoS) features available on the NBG-460N.

7.4.1 WMM QoS

WMM (Wi-Fi MultiMedia) QoS (Quality of Service) ensures quality of service in wireless networks. It controls WLAN transmission priority on packets to be transmitted over the wireless network.

WMM QoS prioritizes wireless traffic according to delivery requirements. WMM QoS is a part of the IEEE 802.11e QoS enhancement to certified Wi-Fi wireless networks.

On APs without WMM QoS, all traffic streams are given the same access priority to the wireless network. If the introduction of another traffic stream creates a data transmission demand that exceeds the current network capacity, then the new traffic stream reduces the throughput of the other traffic streams.

The NBG-460N uses WMM QoS to prioritize traffic streams according to the IEEE 802.1q tag or DSCP information in each packet's header. The NBG-460N automatically determines the priority to use for an individual traffic stream. This prevents reductions in data transmission for applications that are sensitive to latency (delay) and jitter (variations in delay).

7.4.1.1 WMM QoS Priorities

The following table describes the WMM QoS priority levels that the NBG-460N uses.

Table 28 WMM QoS Priorities

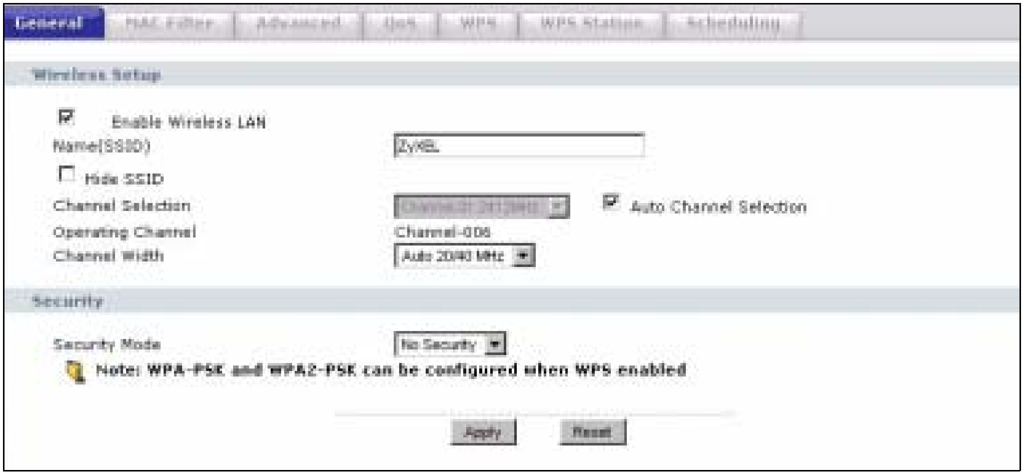
PRIORITY LEVEL	DESCRIPTION
voice (WMM_VOICE)	Typically used for traffic that is especially sensitive to jitter. Use this priority to reduce latency for improved voice quality.
video (WMM_VIDEO)	Typically used for traffic which has some tolerance for jitter but needs to be prioritized over other data traffic.
best effort (WMM_BEST_EFFORT)	Typically used for traffic from applications or devices that lack QoS capabilities. Use best effort priority for traffic that is less sensitive to latency, but is affected by long delays, such as Internet surfing.
background (WMM_BACKGROUND)	This is typically used for non-critical traffic such as bulk transfers and print jobs that are allowed but that should not affect other applications and users. Use background priority for applications that do not have strict latency and throughput requirements.

7.5 General Wireless LAN Screen

If you are configuring the NBG-460N from a computer connected to the wireless LAN and you change the NBG-460N's SSID, channel or security settings, you will lose your wireless connection when you press **Apply** to confirm. You must then change the wireless settings of your computer to match the NBG-460N's new settings.

Click **Network** > **Wireless LAN** to open the **General** screen.

Figure 61 Network > Wireless LAN > General



☑ Enable Wireless LAN

Name(SSID) ZyXEL

□ Hide SSID

Channel Selection Channel-01 2412MHz ☑ Auto Channel Selection

Operating Channel Channel-006

Channel Width Auto 20/40 MHz

Security Mode No Security

Note: WPA-PSK and WPA2-PSK can be configured when WPS enabled

The following table describes the general wireless LAN labels in this screen.

Table 29 Network > Wireless LAN > General

LABEL	DESCRIPTION
Enable Wireless LAN	Click the check box to activate wireless LAN.
Name(SSID)	(Service Set IDentity) The SSID identifies the Service Set with which a wireless station is associated. Wireless stations associating to the access point (AP) must have the same SSID. Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN.
Hide SSID	Select this check box to hide the SSID in the outgoing beacon frame so a station cannot obtain the SSID through scanning using a site survey tool.
Channel Selection	Set the operating frequency/channel depending on your particular region. Select a channel from the drop-down list box. The options vary depending on the frequency band and the country you are in. Refer to the Connection Wizard chapter for more information on channels. This option is only available if **Auto Channel Selection** is disabled.
Auto Channel Selection	Select this check box for the NBG-460N to automatically choose the channel with the least interference. Deselect this check box if you wish to manually select the channel using the **Channel Section** field.
Operating Channel	This displays the channel the NBG-460N is currently using.
Channel Width	Select whether the NBG-460N uses a wireless channel width of 20 or 40 MHz. A standard 20 MHz channel offers transfer speeds of up to 150Mbps whereas a 40MHz channel uses two standard channels and offers speeds of up to 300 Mbps. Because not all devices support 40 MHz channels, select **Auto 20/40MHz** to allow the NBG-460N to adjust the channel bandwidth automatically.
Security Mode	Select **Static-WEP**, **WPA-PSK**, **WPA**, **WPA2-PSK**, or **WPA2** to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as this device. After you select to use a security, additional options appears in this screen. See 7.5.2, 7.5.3, 7.5.4 sections. Or you can select **No Security** to allow any client to associate this network without authentication. Note: If you enable the WPS function, only **No Security**, **WPA-PSK** and **WPA2-PSK** are available in this field.

Table 29 Network > Wireless LAN > General

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

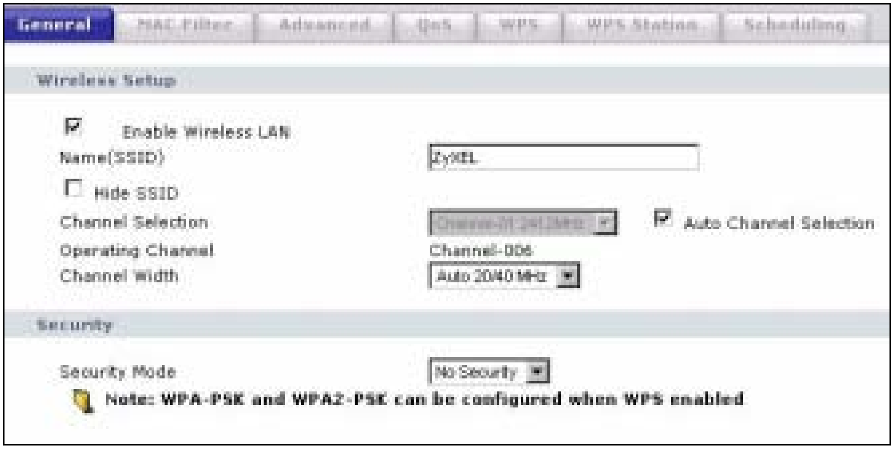
See the rest of this chapter for information on the other labels in this screen.

7.5.1 No Security

Select **No Security** to allow wireless stations to communicate with the access points without any data encryption.

If you do not enable any wireless security on your NBG-460N, your network is accessible to any wireless networking device that is within range.

Figure 62 Network > Wireless LAN > General: No Security



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): ZyXEL

☐ Hide SSID

Channel Selection: Channel-01 2412MHz ☑ Auto Channel Selection

Operating Channel: Channel-006

Channel Width: Auto 20/40 MHz

Security

Security Mode: No Security

Note: WPA-PSK and WPA2-PSK can be configured when WPS enabled

The following table describes the labels in this screen.

Table 30 Wireless No Security

LABEL	DESCRIPTION
Security Mode	Choose **No Security** from the drop-down list box.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

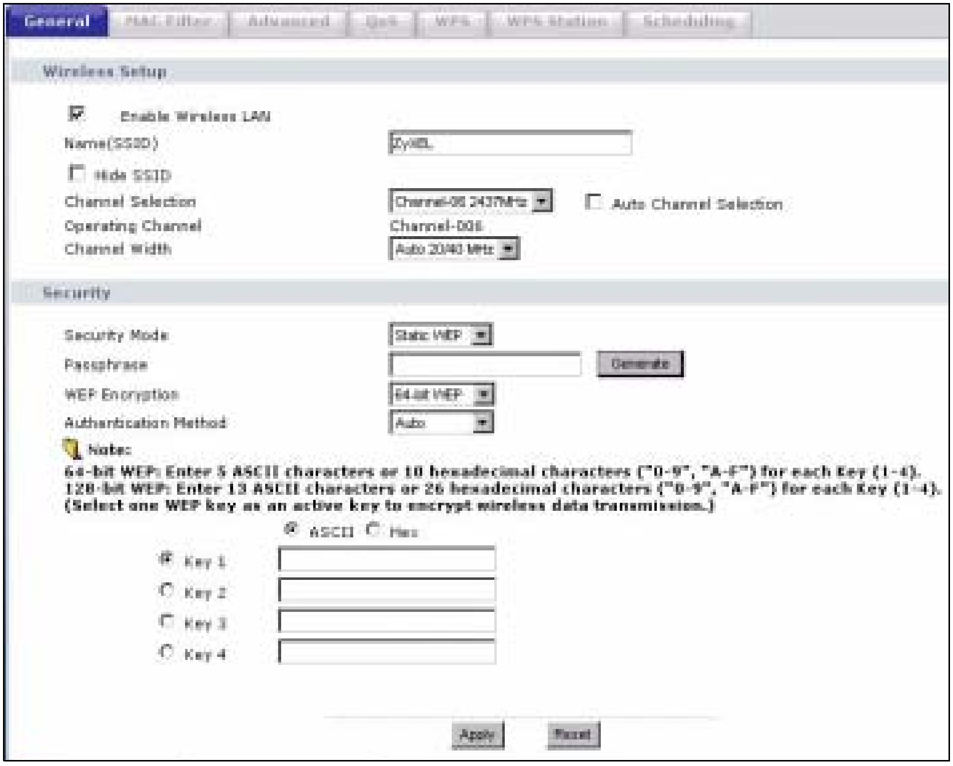
7.5.2 WEP Encryption

WEP encryption scrambles the data transmitted between the wireless stations and the access points to keep network communications private. It encrypts unicast and multicast communications in a network. Both the wireless stations and the access points must use the same WEP key.

Your NBG-460N allows you to configure up to four 64-bit or 128-bit WEP keys but only one key can be enabled at any one time.

In order to configure and enable WEP encryption; click **Network** > **Wireless LAN** to display the **General** screen. Select **Static WEP** from the **Security Mode** list.

Figure 63 Network > Wireless LAN > General: Static WEP



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): ZyXEL

□ Hide SSID

Channel Selection: Channel-06 2437MHz □ Auto Channel Selection

Operating Channel: Channel-006

Channel Width: Auto 20/40 MHz

Security

Security Mode: Static WEP

Passphrase:

WEP Encryption: 64-bit WEP

Authentication Method: Auto

Note:
64-bit WEP: Enter 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F") for each Key (1-4).
128-bit WEP: Enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F") for each Key (1-4).
(Select one WEP key as an active key to encrypt wireless data transmission.)

● ASCII ○ Hex

● Key 1
○ Key 2
○ Key 3
○ Key 4

The following table describes the wireless LAN security labels in this screen.

Table 31 Network > Wireless LAN > General: Static WEP

LABEL	DESCRIPTION
Passphrase	Enter a passphrase (password phrase) of up to 32 printable characters and click **Generate**. The NBG-460N automatically generates four different WEP keys and displays them in the **Key** fields below.
WEP Encryption	Select **64-bit WEP** or **128-bit WEP** to enable data encryption.
Authentication Method	This field is activated when you select **64-bit WEP** or **128-bit WEP** in the **WEP Encryption** field. Select **Auto** or **Shared Key** from the drop-down list box.
ASCII	Select this option in order to enter ASCII characters as WEP key.
Hex	Select this option in order to enter hexadecimal characters as a WEP key. The preceding "0x", that identifies a hexadecimal key, is entered automatically.

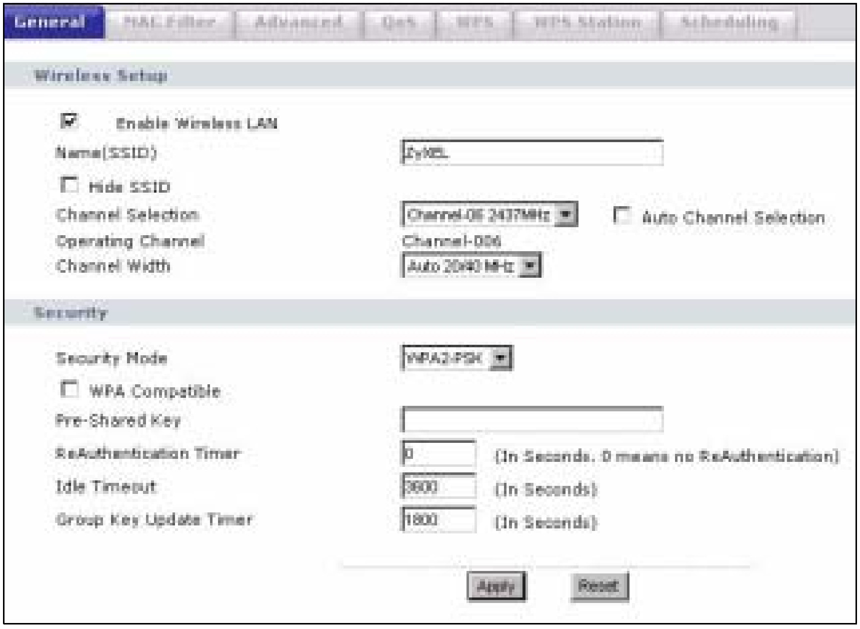
Table 31 Network > Wireless LAN > General: Static WEP

LABEL	DESCRIPTION
Key 1 to Key 4	The WEP keys are used to encrypt data. Both the NBG-460N and the wireless stations must use the same WEP key for data transmission. If you chose **64-bit WEP**, then enter any 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F"). If you chose **128-bit WEP**, then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F"). You must configure at least one key, only one key can be activated at any one time. The default key is key 1.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

7.5.3 WPA-PSK/WPA2-PSK

Click **Network** > **Wireless LAN** to display the **General** screen. Select **WPA-PSK** or **WPA2-PSK** from the **Security Mode** list.

Figure 64 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): ZyXEL

☐ Hide SSID

Channel Selection: Channel-06 2437MHz ☐ Auto Channel Selection

Operating Channel: Channel-006

Channel Width: Auto 20/40 MHz

Security

Security Mode: WPA2-PSK

☐ WPA Compatible

Pre-Shared Key:

ReAuthentication Timer: 0 (In Seconds, 0 means no ReAuthentication)

Idle Timeout: 3600 (In Seconds)

Group Key Update Timer: 1800 (In Seconds)

The following table describes the labels in this screen.

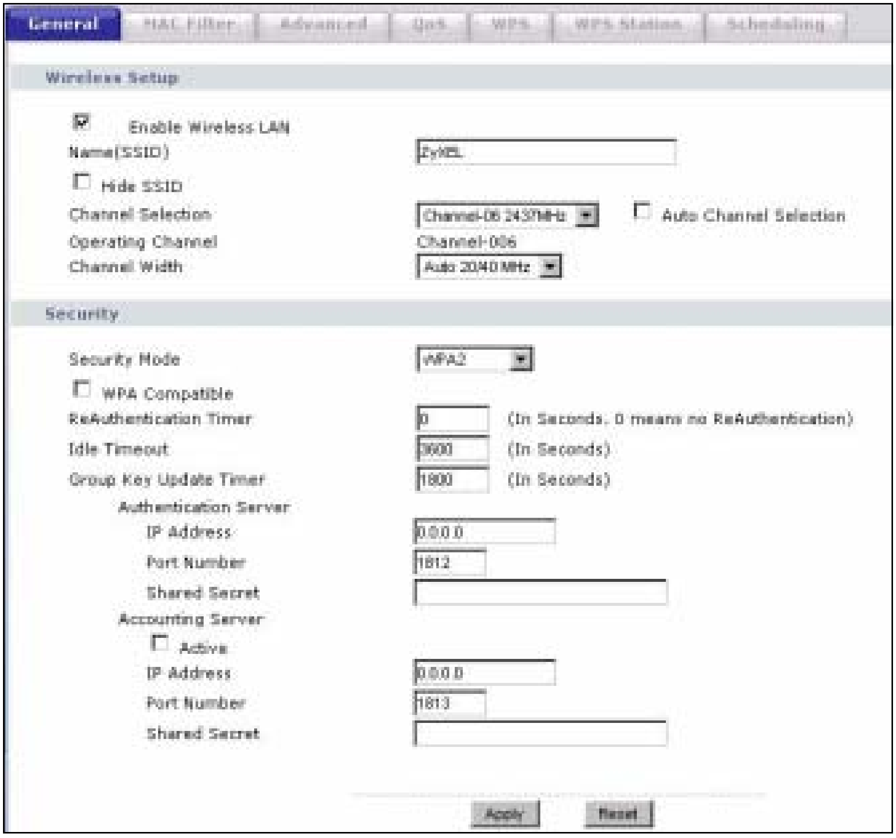
Table 32 Network > Wireless LAN > General: WPA-PSK/WPA2-PSK

LABEL	DESCRIPTION
WPA Compatible	This check box is available only when you select **WPA2-PSK** or **WPA2** in the **Security Mode** field. Select the check box to have both WPA2 and WPA wireless clients be able to communicate with the NBG-460N even when the NBG-460N is using WPA2-PSK or WPA2.
Pre-Shared Key	The encryption mechanisms used for **WPA/WPA2** and **WPA-PSK/WPA2-PSK** are the same. The only difference between the two is that **WPA-PSK/WPA2-PSK** uses a simple common password, instead of user-specific credentials. Type a pre-shared key from 8 to 63 case-sensitive ASCII characters (including spaces and symbols).
ReAuthentication Timer (in seconds)	Specify how often wireless stations have to resend usernames and passwords in order to stay connected. Enter a time interval between 10 and 9999 seconds. The default time interval is 1800 seconds (30 minutes). Note: If wireless station authentication is done using a RADIUS server, the reauthentication timer on the RADIUS server has priority.
Idle Timeout	The NBG-460N automatically disconnects a wireless station from the wired network after a period of inactivity. The wireless station needs to enter the username and password again before access to the wired network is allowed. The default time interval is 3600 seconds (or 1 hour).
Group Key Update Timer	The **Group Key Update Timer** is the rate at which the AP (if using **WPA-PSK/WPA2-PSK** key management) or RADIUS server (if using **WPA/WPA2** key management) sends a new group key out to all clients. The re-keying process is the WPA/WPA2 equivalent of automatically changing the WEP key for an AP and all stations in a WLAN on a periodic basis. Setting of the **Group Key Update Timer** is also supported in **WPA-PSK/WPA2-PSK** mode. The default is **1800** seconds (30 minutes).
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

7.5.4 WPA/WPA2

Click **Network** > **Wireless LAN** to display the **General** screen. Select **WPA** or **WPA2** from the **Security Mode** list.

Figure 65 Network > Wireless LAN > General: WPA/WPA2



Wireless Setup

☑ Enable Wireless LAN

Name(SSID): ZyXEL

□ Hide SSID

Channel Selection: Channel-06 2437MHz ▾ □ Auto Channel Selection

Operating Channel: Channel-006

Channel Width: Auto 20/40 MHz ▾

Security

Security Mode: WPA2 ▾

□ WPA Compatible

ReAuthentication Timer: 0 (In Seconds. 0 means no ReAuthentication)

Idle Timeout: 3600 (In Seconds)

Group Key Update Timer: 1800 (In Seconds)

Authentication Server

IP Address: 0.0.0.0

Port Number: 1812

Shared Secret:

Accounting Server

□ Active

IP Address: 0.0.0.0

Port Number: 1813

Shared Secret:

The following table describes the labels in this screen.

Table 33 Network > Wireless LAN > General: WPA/WPA2

LABEL	DESCRIPTION
WPA Compatible	This check box is available only when you select **WPA2-PSK** or **WPA2** in the **Security Mode** field. Select the check box to have both WPA2 and WPA wireless clients be able to communicate with the NBG-460N even when the NBG-460N is using WPA2-PSK or WPA2.
ReAuthentication Timer (in seconds)	Specify how often wireless stations have to resend usernames and passwords in order to stay connected. Enter a time interval between 10 and 9999 seconds. The default time interval is 1800 seconds (30 minutes). Note: If wireless station authentication is done using a RADIUS server, the reauthentication timer on the RADIUS server has priority.
Idle Timeout	The NBG-460N automatically disconnects a wireless station from the wired network after a period of inactivity. The wireless station needs to enter the username and password again before access to the wired network is allowed. The default time interval is 3600 seconds (or 1 hour).

Table 33 Network > Wireless LAN > General: WPA/WPA2

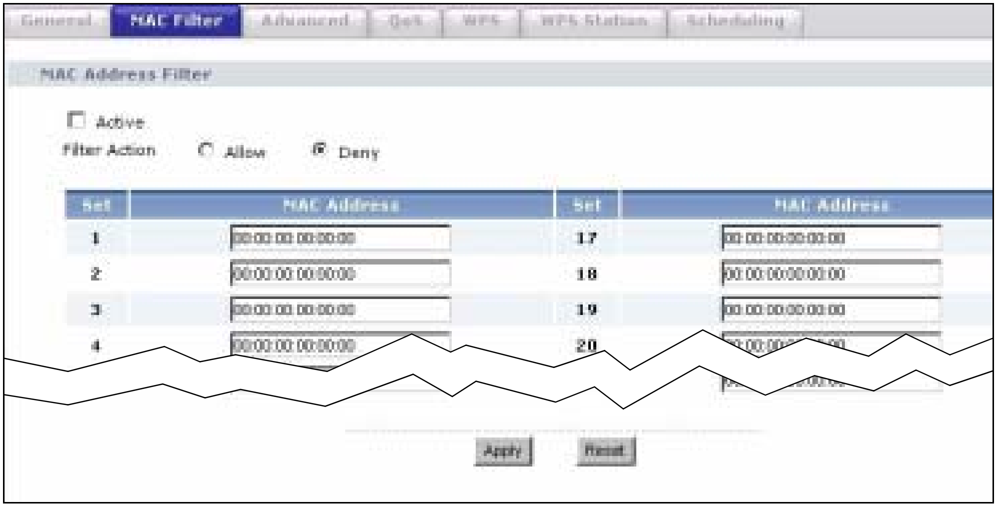
LABEL	DESCRIPTION
Group Key Update Timer	The **Group Key Update Timer** is the rate at which the AP (if using **WPA-PSK/WPA2-PSK** key management) or RADIUS server (if using **WPA/WPA2** key management) sends a new group key out to all clients. The re-keying process is the WPA/WPA2 equivalent of automatically changing the WEP key for an AP and all stations in a WLAN on a periodic basis. Setting of the **Group Key Update Timer** is also supported in **WPA-PSK/WPA2-PSK** mode. The NBG-460N default is **1800** seconds (30 minutes).
Authentication Server	
IP Address	Enter the IP address of the external authentication server in dotted decimal notation.
Port Number	Enter the port number of the external authentication server. The default port number is **1812**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Enter a password (up to 31 alphanumeric characters) as the key to be shared between the external authentication server and the NBG-460N. The key must be the same on the external authentication server and your NBG-460N. The key is not sent over the network.
Accounting Server	
Active	Select **Yes** from the drop down list box to enable user accounting through an external authentication server.
IP Address	Enter the IP address of the external accounting server in dotted decimal notation.
Port Number	Enter the port number of the external accounting server. The default port number is **1813**. You need not change this value unless your network administrator instructs you to do so with additional information.
Shared Secret	Enter a password (up to 31 alphanumeric characters) as the key to be shared between the external accounting server and the NBG-460N. The key must be the same on the external accounting server and your NBG-460N. The key is not sent over the network.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

7.6 MAC Filter

The MAC filter screen allows you to configure the NBG-460N to give exclusive access to up to 32 devices (Allow) or exclude up to 32 devices from accessing the NBG-460N (Deny). Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC address of the devices to configure this screen.

To change your NBG-460N’s MAC filter settings, click **Network** > **Wireless LAN** > **MAC Filter**. The screen appears as shown.

Figure 66 Network > Wireless LAN > MAC Filter



☐ Active

Filter Action ○ Allow ● Deny

Set	MAC Address	Set	MAC Address
1	00:00:00:00:00:00	17	00:00:00:00:00:00
2	00:00:00:00:00:00	18	00:00:00:00:00:00
3	00:00:00:00:00:00	19	00:00:00:00:00:00
4	00:00:00:00:00:00	20	00:00:00:00:00:00

The following table describes the labels in this menu.

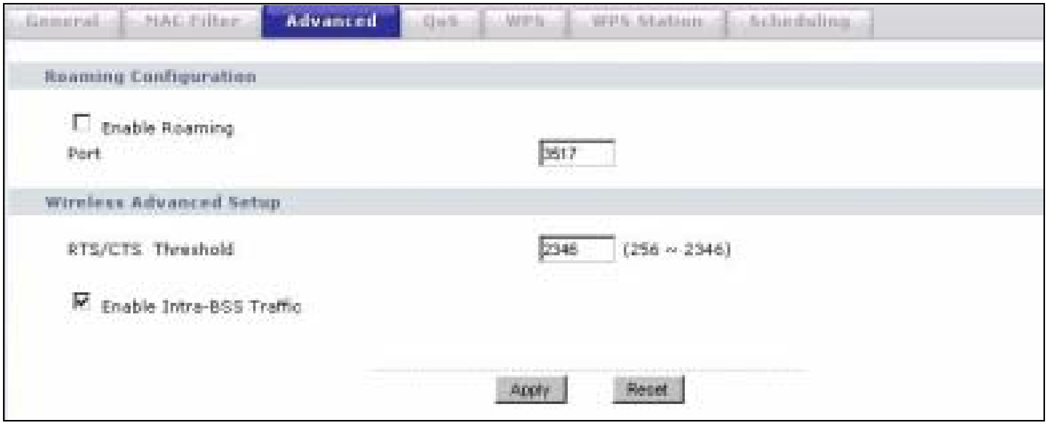
Table 34 Network > Wireless LAN > MAC Filter

LABEL	DESCRIPTION
Active	Select **Yes** from the drop down list box to enable MAC address filtering.
Filter Action	Define the filter action for the list of MAC addresses in the **MAC Address** table. Select **Deny** to block access to the NBG-460N, MAC addresses not listed will be allowed to access the NBG-460N Select **Allow** to permit access to the NBG-460N, MAC addresses not listed will be denied access to the NBG-460N.
Set	This is the index number of the MAC address.
MAC Address	Enter the MAC addresses of the wireless station that are allowed or denied access to the NBG-460N in these address fields. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

7.7 Wireless LAN Advanced Screen

Click **Network** > **Wireless LAN** > **Advanced**. The screen appears as shown.

Figure 67 Network > Wireless LAN > Advanced



Roaming Configuration

□ Enable Roaming

Port 3517

Wireless Advanced Setup

RTS/CTS Threshold 2346 (256 ~ 2346)

☑ Enable Intra-BSS Traffic

The following table describes the labels in this screen.

Table 35 Network > Wireless LAN > Advanced

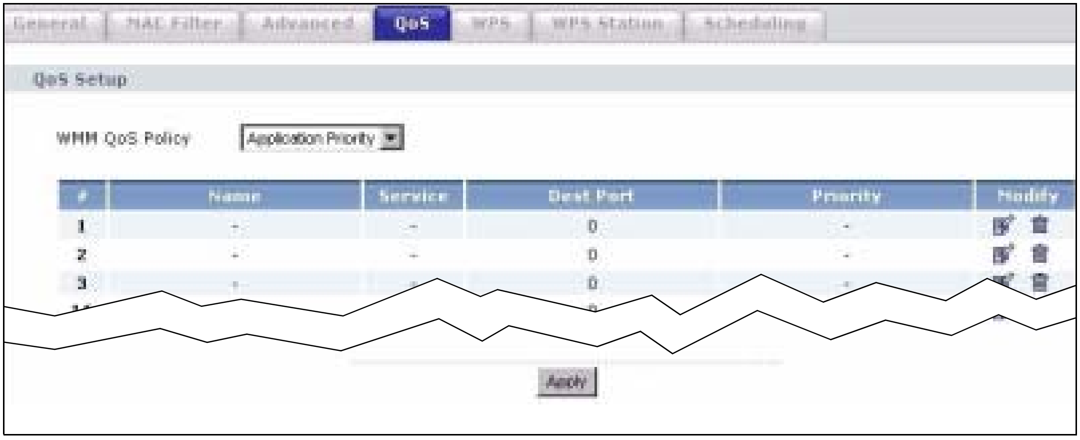
LABEL	DESCRIPTION
Roaming Configuration	
Enable Roaming	Select this option if your network environment has multiple APs and you want your wireless device to be able to access the network as you move between wireless networks.
Wireless Advanced Setup	
RTS/CTS Threshold	Data with its frame size larger than this value will perform the RTS (Request To Send)/CTS (Clear To Send) handshake. Enter a value between 0 and 2432.
Enable Intra-BSS Traffic	A Basic Service Set (BSS) exists when all communications between wireless clients or between a wireless client and a wired network client go through one access point (AP). Intra-BSS traffic is traffic between wireless clients in the BSS. When Intra-BSS is enabled, wireless client **A** and **B** can access the wired network and communicate with each other. When Intra-BSS is disabled, wireless client **A** and **B** can still access the wired network but cannot communicate with each other.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

7.8 Quality of Service (QoS) Screen

The QoS screen allows you to automatically give a service (such as e-mail, VoIP or FTP) a priority level.

Click **Network** > **Wireless LAN** > **QoS**. The following screen appears.

Figure 68 Network > Wireless LAN > QoS



QoS Setup

WMM QoS Policy: Application Priority

#	Name	Service	Dest Port	Priority	Modify
1	-	-	0	-	
2	-	-	0	-	
3	-	-	0	-	

The following table describes the labels in this screen.

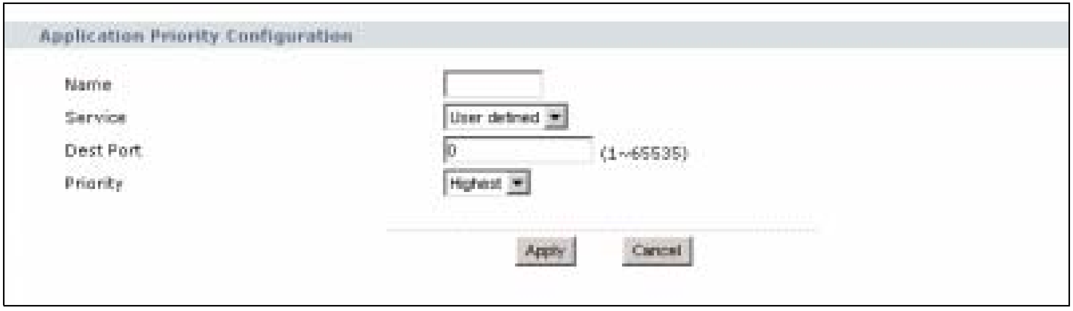
Table 36 Network > Wireless LAN > QoS

LABEL	DESCRIPTION
WMM QoS Policy	Select **Default** to have the NBG-460N automatically give a service a priority level according to the ToS value in the IP header of packets it sends. WMM QoS (Wifi MultiMedia Quality of Service) gives high priority to voice and video, which makes them run more smoothly. Select **Application Priority** from the drop-down list box to display a table of application names, services, ports and priorities to which you want to apply WMM QoS.
	The table appears only if you select **Application Priority** in **WMM QoS Policy**.
#	This is the number of an individual application entry.
Name	This field displays a description given to an application entry.
Service	This field displays either **FTP**, **WWW**, **E-mail** or a **User Defined** service to which you want to apply WMM QoS.
Dest Port	This field displays the destination port number to which the application sends traffic.
Priority	This field displays the priority of the application. **Highest** - Typically used for voice or video that should be high-quality. **High** - Typically used for voice or video that can be medium-quality. **Mid** - Typically used for applications that do not fit into another priority. For example, Internet surfing. **Low** - Typically used for non-critical “background” applications, such as large file transfers and print jobs that should not affect other applications.
Modify	Click the **Edit** icon to open the **Application Priority Configuration** screen. Modify an existing application entry or create a application entry in the **Application Priority Configuration** screen. Click the **Remove** icon to delete an application entry.
Apply	Click **Apply** to save your changes to the NBG-460N.

7.8.1 Application Priority Configuration

Use this screen to edit a WMM QoS application entry. Click the edit icon under **Modify**. The following screen displays.

Figure 69 Network > Wireless LAN > QoS: Application Priority Configuration



Application Priority Configuration

Name

Service: User defined

Dest Port: 0 (1~65535)

Priority: Highest

See Appendix F on page 321 for a list of commonly-used services and destination ports. The following table describes the fields in this screen.

Network > Wireless LAN > QoS: Application Priority Configuration

LABEL	DESCRIPTION
Application Priority Configuration	
Name	Type a description of the application priority.
Service	The following is a description of the applications you can prioritize with WMM QoS. Select a service from the drop-down list box. • **E-Mail** Electronic mail consists of messages sent through a computer network to specific groups or individuals. Here are some default ports for e-mail: POP3 - port 110 IMAP - port 143 SMTP - port 25 HTTP - port 80 • **FTP** File Transfer Protocol enables fast transfer of files, including large files that it may not be possible to send via e-mail. FTP uses port number 21. • **WWW** The World Wide Web is an Internet system to distribute graphical, hyper-linked information, based on Hyper Text Transfer Protocol (HTTP) - a client/server protocol for the World Wide Web. The Web is not synonymous with the Internet; rather, it is just one service on the Internet. Other services on the Internet include Internet Relay Chat and Newsgroups. The Web is accessed through use of a browser. • **User-Defined** User-defined services are user specific services configured using known ports and applications.
Dest Port	This displays the port the selected service uses. Type a port number in the field provided if you want to use a different port to the default port.
Priority	Select a priority from the drop-down list box.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Cancel	Click **Cancel** to return to the previous screen.

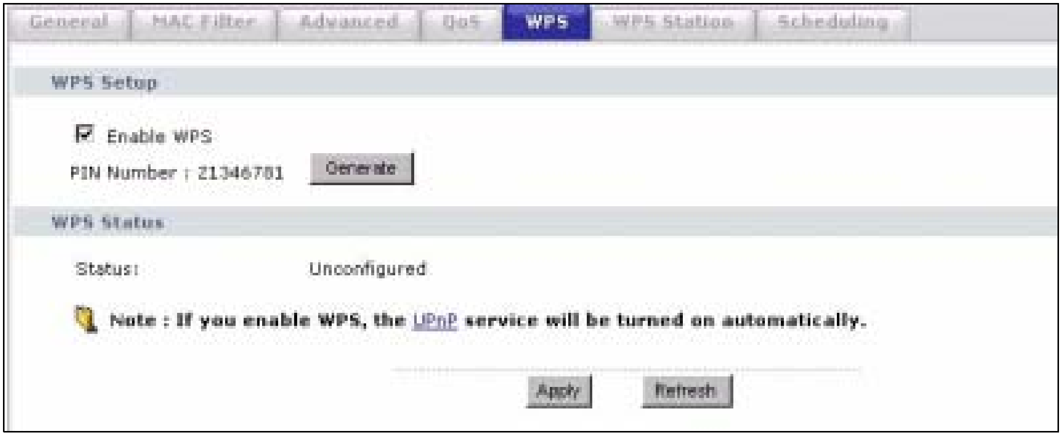
7.9 WiFi Protected Setup

WiFi Protected Setup (WPS) is an industry standard specification, defined by the WiFi Alliance. WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Depending on the devices in your network, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (Personal Identification Number) in the devices. Then, they connect and set up a secure network by themselves. See how to set up a secure wireless network using WPS in the Section 6.1.2 on page 73.

7.9.1 WPS Screen

Use this screen to enable/disable WPS, view or generate a new PIN number and check current WPS status. To open this screen, click **Network** > **Wireless LAN** > **WPS** tab.

Figure 70 WPS



WPS Setup

☑ Enable WPS

PIN Number : 21346781

WPS Status

Status: Unconfigured

Note : If you enable WPS, the UPnP service will be turned on automatically.

The following table describes the labels in this screen.

Table 37 WPS

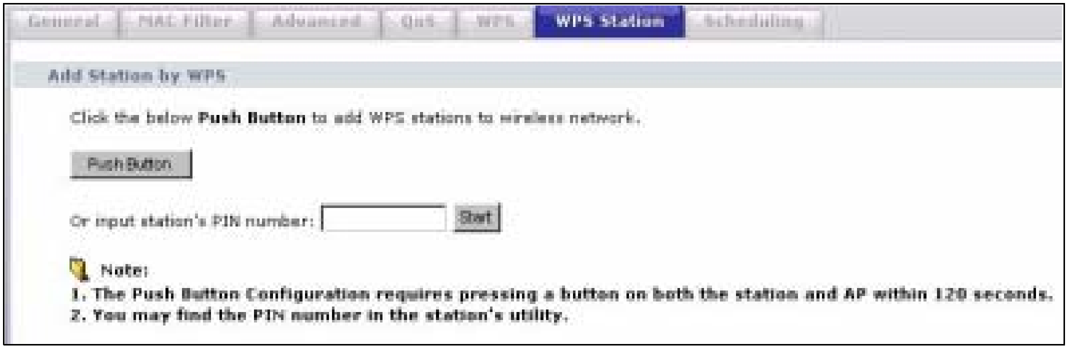
LABEL	DESCRIPTION
WPS Setup	
Enable WPS	Select this to enable the WPS feature.
PIN Number	This displays a PIN number last time system generated. Click **Generate** to generate a new PIN number.
WPS Status	
Status	This displays **Configured** when the NBG-460N has connected to a wireless network using WPS or when **Enable WPS** is selected and wireless or wireless security settings have been changed. The current wireless and wireless security settings also appear in the screen. This displays **Unconfigured** if WPS is disabled and there are no wireless or wireless security changes on the NBG-460N or you click **Release_Configuration** to remove the configured wireless and wireless security settings.
Release Configuration	This button is only available when the WPS status displays **Configured**. Click this button to remove all configured wireless and wireless security settings for WPS connections on the NBG-460N.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Refresh	Click **Refresh** to get this screen information afresh.

7.9.2 WPS Station Screen

Use this screen when you want to add a wireless station using WPS. To open this screen, click **Network** > **Wireless LAN** > **WPS Station** tab.

Note: After you click **Push Button** on this screen, you have to press a similar button in the wireless station utility within 2 minutes. To add the second wireless station, you have to press these buttons on both device and the wireless station again after the first 2 minutes.

Figure 71 WPS Station



Add Station by WPS

Click the below **Push Button** to add WPS stations to wireless network.

Or input station's PIN number:

Note:
1. The Push Button Configuration requires pressing a button on both the station and AP within 120 seconds.
2. You may find the PIN number in the station's utility.

The following table describes the labels in this screen.

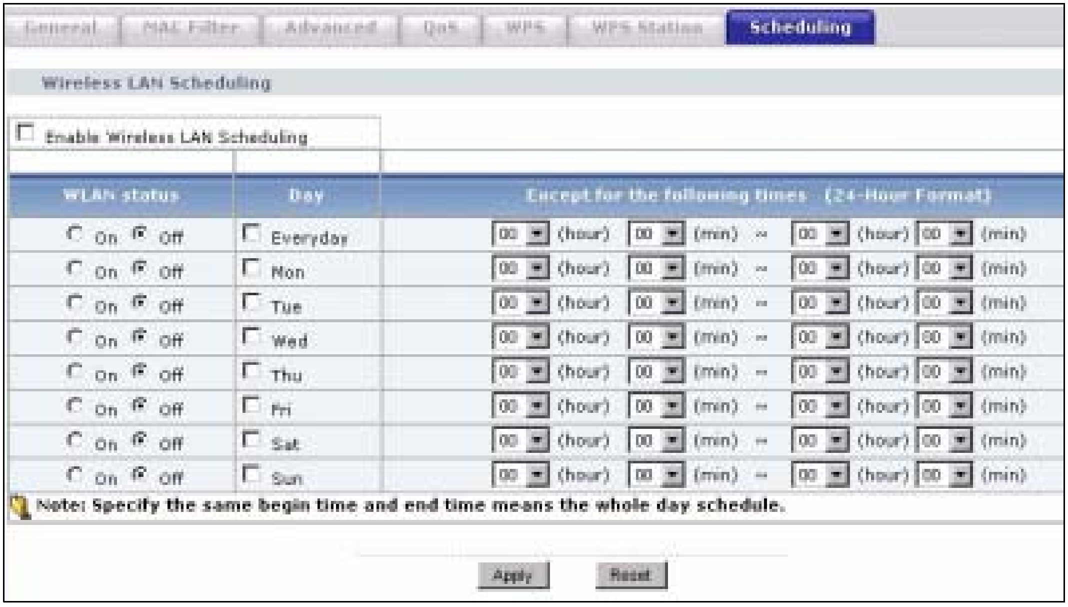
Table 38 WPS Station

LABEL	DESCRIPTION
Push Button	Use this button when you use the PBC (Push Button Configuration) method to configure wireless stations's wireless settings. See Section 6.1.2.1 on page 74. Click this to start WPS-aware wireless station scanning and the wireless security information synchronization.
Or input station's PIN number	Use this button when you use the PIN Configuration method to configure wireless station's wireless settings. See Section 6.1.2.2 on page 75. Type the same PIN number generated in the wireless station's utility. Then click **Start** to associate to each other and perform the wireless security information synchronization.

7.9.3 Scheduling

Use this screen to set the times your wireless LAN is turned on and off. Wireless LAN scheduling is disabled by default. The wireless LAN can be scheduled to turn on or off on certain days and at certain times. To open this screen, click **Network** > **Wireless LAN** > **Scheduling** tab.

Figure 72 Scheduling



Wireless LAN Scheduling

□ Enable Wireless LAN Scheduling

WLAN status	Day	Except for the following times (24-Hour Format)
○ On ● Off	□ Everyday	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Mon	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Tue	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Wed	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Thu	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Fri	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Sat	00 (hour) 00 (min) ~ 00 (hour) 00 (min)
○ On ● Off	□ Sun	00 (hour) 00 (min) ~ 00 (hour) 00 (min)

Note: Specify the same begin time and end time means the whole day schedule.

The following table describes the labels in this screen.

Table 39 Scheduling

LABEL	DESCRIPTION
Enable Wireless LAN Scheduling	Select this to enable Wireless LAN scheduling.
WLAN Status	Select **On** or **Off** to specify whether the Wireless LAN is turned on or off. This field works in conjunction with the **Day** and **Except for the following times** fields.
Day	Select **Everyday** or the specific days to turn the Wireless LAN on or off. If you select **Everyday** you can not select any specific days. This field works in conjunction with the **Except for the following times** field.
Except for the following times (24-Hour Format)	Select a begin time using the first set of **hour** and minute (**min**) drop down boxes and select an end time using the second set of **hour** and minute (**min**) drop down boxes. If you have chosen **On** earlier for the WLAN Status the Wireless LAN will turn off between the two times you enter in these fields. If you have chosen **Off** earlier for the WLAN Status the Wireless LAN will turn on between the two times you enter in these fields. Note: Entering the same begin time and end time will mean the whole day.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to reload the previous configuration for this screen.

7.10 iPod Touch Web Configurator

The iPod Touch web configurator displays when you are connecting to the NBG-460N wirelessly with an iPod Touch device through a web browser. It is different to the web configurator that you access from your computer.

To connect wirelessly to the iPod Touch web configurator with your iPod Touch follow the steps below:

1 Make sure the Wireless LAN on the NBG-460N is enabled and that you know the security settings (if any). To do this check the **Wireless LAN > General** screen in the web configurator from your computer.

2 On the iPod Touch's main screen press **Settings > Wi-fi** and from the list press the NBG-460N's network name (SSID) to connect to it. If you are prompted for any security settings enter them and press connect. If you cannot connect check your security settings in the web configurator from your computer and try again.

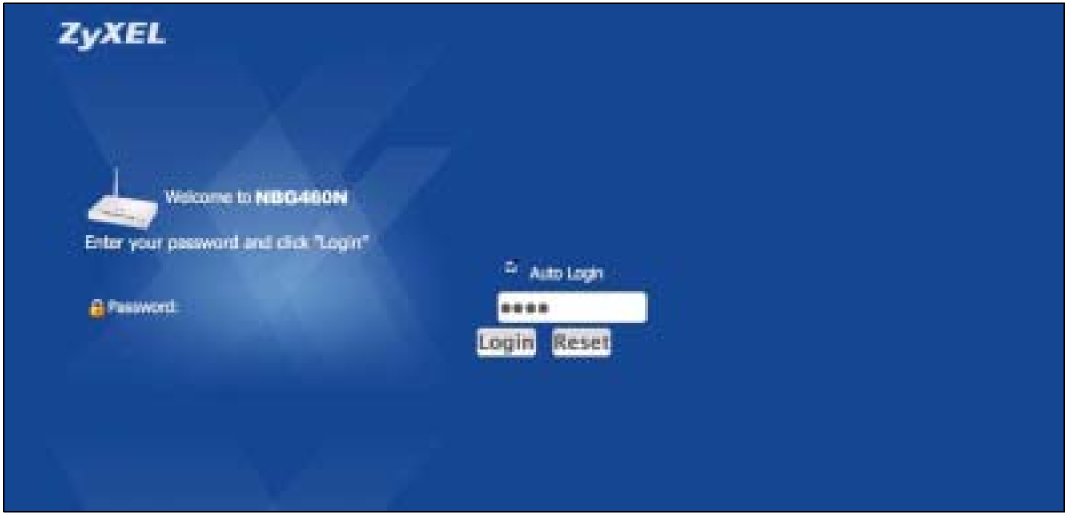
3 After connecting to the NBG-460N's wireless LAN network launch the iPod Touch Internet browser and enter the NBG-460N's IP address (default: 192.168.1.1) into the address bar. The login screen displays.

7.10.1 Login Screen

After accessing the NBG-460N's IP address in the iPod Touch web browser the screen below will display.

You cannot change your password in the iPod Touch web configurator. To change your password log into the web configurator using your computer.

Figure 73 Login Screen



The following table describes the labels in this screen.

Table 40 Login Screen

LABEL	DESCRIPTION
Auto Login	Select this checkbox to automatically log into the iPod Touch web configurator when accessing it through the same iPod Touch device.
Password	Enter the password for the NBG-460N. If you haven't changed the default password earlier this is "**1234**".
Login	Press the **Login** button to log into the iPod Touch web configurator.
Reset	Press the **Reset** button to clear your selections and start over.

7.10.2 System Status

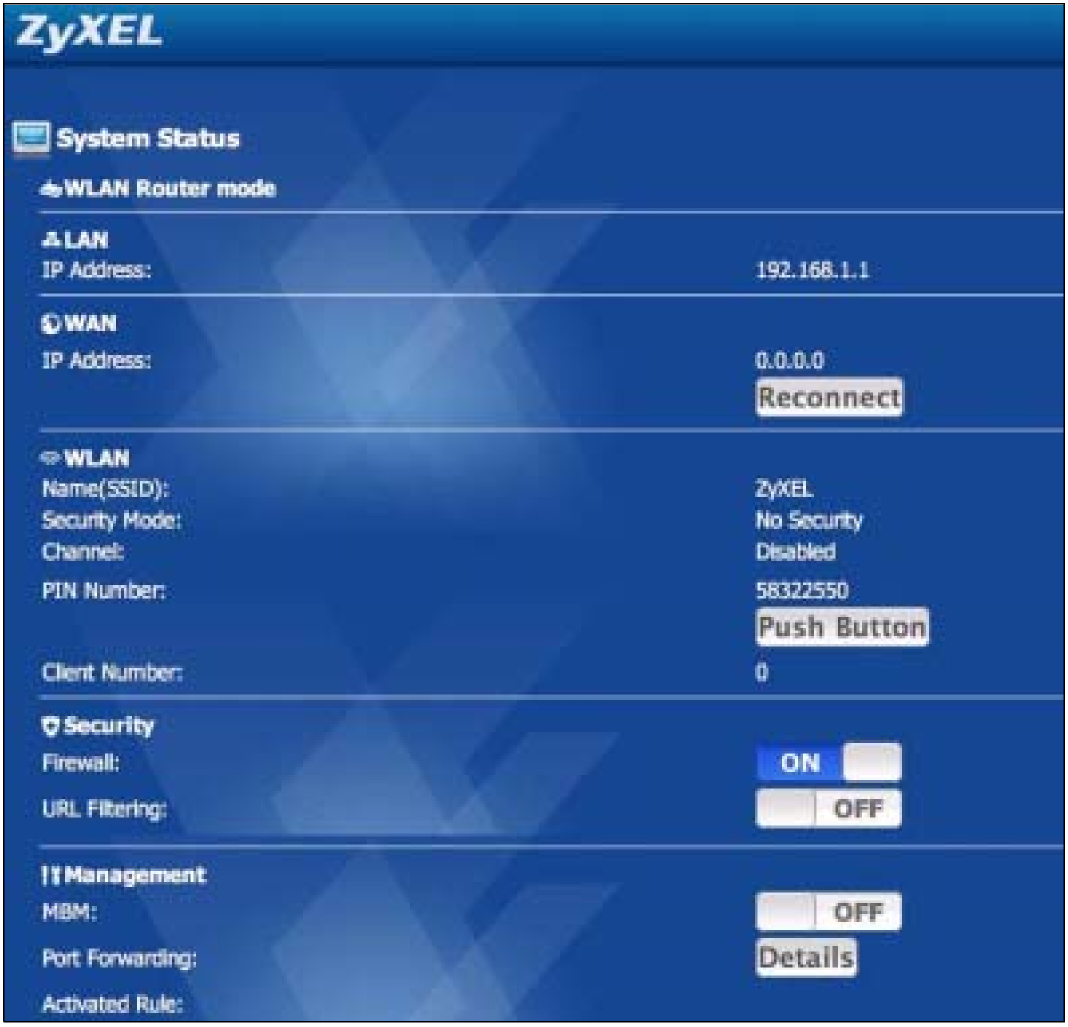
After successfully logging into the iPod Touch web configurator the **System Status** screen displays.

✍ Your changes in the iPod Touch web configurator are saved automatically after pressing a button.

If you are going to use the WPS (Wi-Fi Protected Setup) function in the iPod Touch Web Configurator it is recommended to configure your WPS settings first from your computer.

If WPS has not been configured previously the iPod Touch will lose it’s wireless connection to the NBG-460N after the NBG-460N has connected to another device using WPS through the iPod Touch web configurator. To reconnect to the wireless network using your iPod Touch you must find out the new WPS settings by logging into the web configurator from your computer and going to the **Wireless LAN** screen.

Figure 74 System Status screen



ZyXEL

System Status

WLAN Router mode

LAN

IP Address: 192.168.1.1

WAN

IP Address: 0.0.0.0

Reconnect

WLAN

Name(SSID): ZyXEL

Security Mode: No Security

Channel: Disabled

PIN Number: 58322550

Push Button

Client Number: 0

Security

Firewall: ON

URL Filtering: OFF

Management

MBM: OFF

Port Forwarding: Details

Activated Rule:

The following table describes the labels in this screen.

Table 41 System Status screen

LABEL	DESCRIPTION
Logout	Press this to logout of the iPod Touch web configurator.
LAN	
IP Address	This field displays the NBG-460N’s LAN (Local Area Network) IP address.
WAN	
IP Address	This field displays the NBG-460N’s WAN IP address. If this field displays “**-**” it means the WAN is not connected. Try pressing **Reconnect** if your WAN connection is not working.
Reconnect	Press **Reconnect** to renew your NBG-460N’s WAN connection.
WLAN	
Name (SSID)	This field displays the SSID (Service set identifier) of the NBG-460N’s Wireless LAN.
Security Mode	This field displays the security authentication mode of the NBG-460N’s Wireless LAN. This can be **No Security**, **WPA-PSK**, **WPA2-PSK** or **WEP**.

Table 41 System Status screen

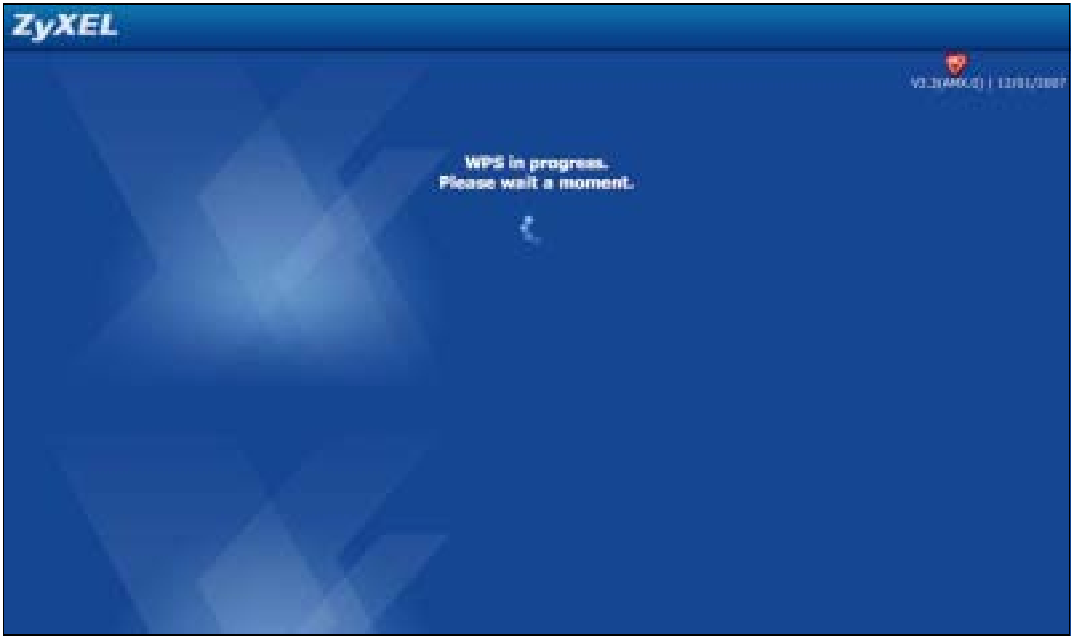
LABEL	DESCRIPTION
Channel	This field displays the channel the NBG-460N's Wireless LAN operates on. This will display as disabled if auto channel selection mode is on.
PIN Number	This field displays the NBG-460N's WPS (Wi-Fi Protected Setup) PIN number. WPS allows you to connect wireless clients to your wireless LAN easily. See Section 7.9 on page 106 for more information on WPS and the PIN method of configuration.
Push Button	Press the **Push Button** to start either the PBC (Push Button Configuration) or PIN method of WPS configuration. The WPS in progress screen will display, see Section 7.10.3 on page 112.
Client Number	This field displays the number of wireless clients on the network.
Security	
Firewall	Press the left side of the button to turn the firewall **ON**. Press the right side of the button to turn the firewall **OFF**. To configure the firewall access the web configurator from your computer. A Firewall enables the NBG-460N to act as a secure gateway between the LAN and the Internet.
URL Filtering	Press the left side of the button to turn URL Filtering **ON**. Press the right side of the button to turn URL Filtering **OFF**. To configure URL filtering access the web configurator from your computer and go to the content filtering screens. Content filtering enables you to block certain web features or specific URL keywords.
Management	
MBM	Press the left side of the button to turn MBM (Media Bandwidth Management) **ON**. Press the right side of the button to turn MBM **OFF**. To configure Media Bandwidth Management access the web configurator from your computer and go to the Bandwidth Management screens. When accessed from a computer the web configurator allows you to specify bandwidth management rules based on an application and/or subnet.
Port Forwarding	Press **Details** to go to another screen to manage the port forwarding rules.
Activated Rule	This field displays the currently activated port forwarding rules.

7.10.3 WPS in Progress

After pressing **Push Button** in the **System Status** screen the WPS in Progress screen will display.

It can take around two minutes for a successful WPS connection to be made. The **System Status** screen will display after a connection has been made or if it has failed. For more information on WPS see Section 7.9 on page 106.

Figure 75 WPS In Progress



WPS in progress.
Please wait a moment.

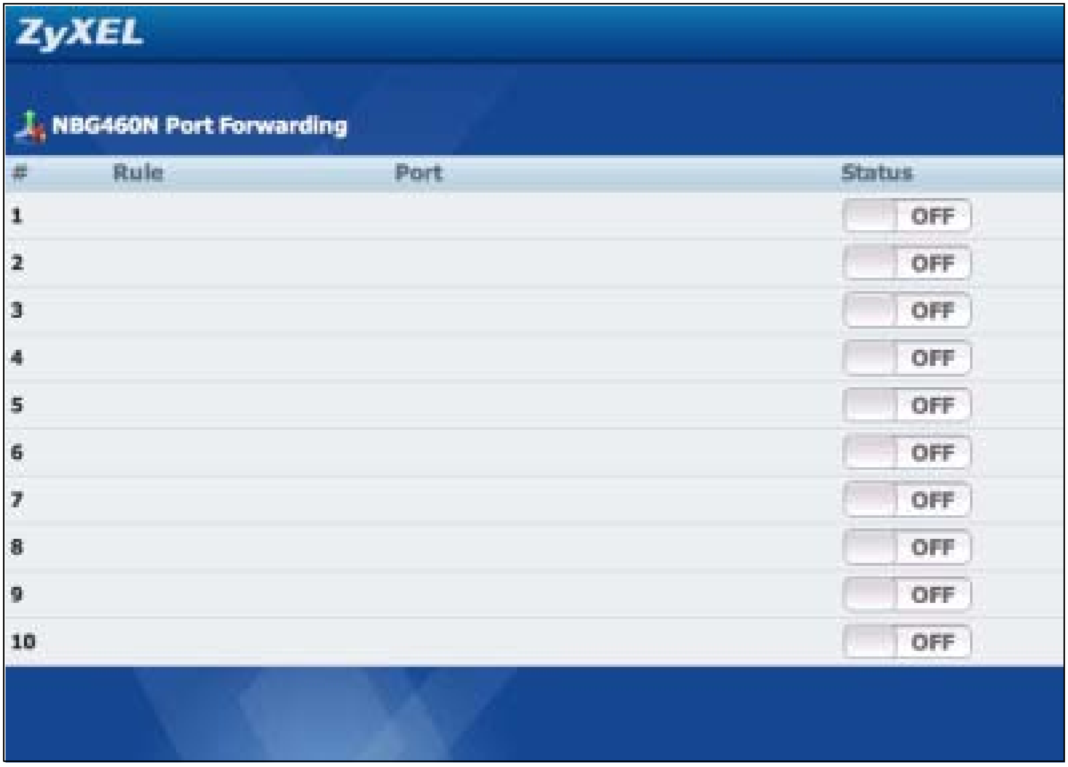
7.10.4 Port Forwarding

After pressing the **Details** button in the **System Status** screen the port forwarding screen will display. Use this screen to change the status of port forwarding rules that have been set up in the web configurator from your computer. See Section 11.4 on page 139 for more information on configuring port forwarding rules.

To go back to the **System Status** screen press the ZyXEL logo at the top of the page.

To see any changes on the **System Status** screen you will need to refresh the page first. Use the browser's refresh function. See the iPod Touch's documentation if you cannot find it.

Figure 76 Port Forwarding



ZyXEL

NBG460N Port Forwarding

#	Rule	Port	Status
1			OFF
2			OFF
3			OFF
4			OFF
5			OFF
6			OFF
7			OFF
8			OFF
9			OFF
10			OFF

The following table describes the labels in this screen.

Table 42 Port Forwarding

LABEL	DESCRIPTION
#	This is the number of an individual port forwarding entry.
Rule	This column displays the configured port forwarding rules. To configure a new rule you must use the web configurator from your computer.
Port	This column displays the port number(s) which are forwarded when the rule is turned on.
Status	Use this column to manage the status of the rules. Press the left side of the button to turn the rule **ON** and press the right side of the button to turn the rule **OFF**.

7.11 Accessing the iPod Touch Web Configurator

To access the iPod Touch web configurator through your iPod Touch you must first connect it to the NBG-460N’s wireless network. Follow the steps below to do this.

If you have not configured your wireless settings yet you can do so by using the Wizard in the web configurator you access from your computer. Click the Wizard icon or the **Go To Wizard Setup** web link you see after logging into the web configurator from your computer. See Chapter 4 on page 49 for more information on using the Wizard.

1 On the iPod Touch's main screen press **Settings** and then press **Wi-fi**.

2 On the list of networks press the NBG-460N's network name (SSID) to connect to it. If you are prompted for any security settings enter them and press connect.

The pre-shared key is case-sensitive. If you have problems connecting then try checking the security settings in the web configurator from your computer and try again.

7.11.1 Accessing the iPod Touch Web Configurator

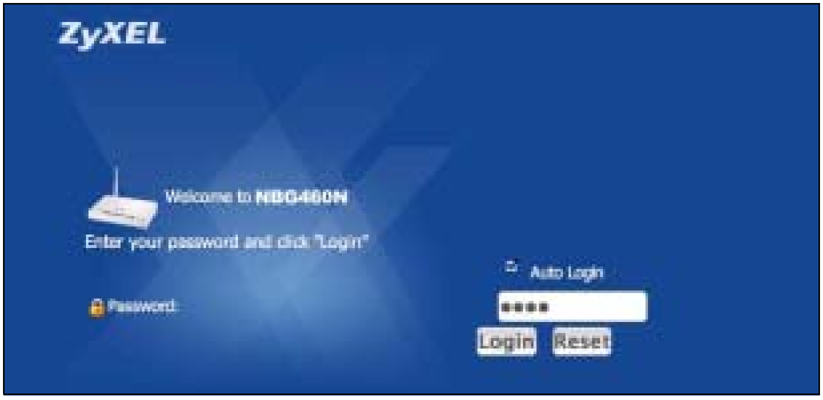
Now that you are connected to the NBG-460N's wireless network you can access the iPod Touch web configurator. To do this follow the steps below:

1 Launch the iPod Touch's web browser from the main screen. The default web browser is Safari.

2 Enter the IP address of the NBG-460N into the address bar and go to that address. The default IP address for the NBG-460N is 192.168.1.1.

3 The login screen should display.

Figure 77 Login Screen



Welcome to NBG460N

Enter your password and click "Login"

Password: ●●●●

Auto Login

?

If the login screen does not display properly, check that you are accessing the correct IP address. Also check your iPod Touch web browser’s security settings as they may affect how the page displays.

4 If you wish to login automatically in the future make sure the **Auto Login** checkbox is selected.

5 Enter your password and press login. The default password for the NBG-460N is “**1234**”.

6 The **System Status** screen will display after successfully logging in. Congratulations! For information on using the configurator see Section 7.10 on page 108.

8

WAN

This chapter describes how to configure WAN settings.

8.1 WAN Overview

See the chapter about the connection wizard for more information on the fields in the WAN screens.

8.2 WAN MAC Address

The MAC address screen allows users to configure the WAN port's MAC address by either using the factory default or cloning the MAC address from a computer on your LAN. Choose **Factory Default** to select the factory assigned default MAC Address.

Otherwise, click **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file. It is recommended that you clone the MAC address prior to hooking up the WAN Port.

8.3 Multicast

Traditionally, IP packets are transmitted in one of either two ways - Unicast (1 sender - 1 recipient) or Broadcast (1 sender - everybody on the network). Multicast delivers IP packets to a group of hosts on the network - not everybody and not just 1.

IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group - it is not used to carry user data. IGMP version 2 (RFC 2236) is an improvement over version 1 (RFC 1112) but IGMP version 1 is still in wide use. If you would like to read more detailed information about interoperability between IGMP version 2 and version 1, please see sections 4 and 5 of RFC 2236. The class D IP address is used to identify host groups and can be in the range 224.0.0.0 to 239.255.255.255. The address 224.0.0.0 is not assigned to any group and is used by IP multicast computers. The address 224.0.0.1 is used for query messages and is assigned to the permanent group of all IP hosts (including gateways). All hosts must join the 224.0.0.1 group in order to participate in IGMP. The address 224.0.0.2 is assigned to the multicast routers group.

The NBG-460N supports both IGMP version 1 (**IGMP-v1**) and IGMP version 2 (**IGMP-v2**). At start up, the NBG-460N queries all directly connected networks to gather group membership. After that, the NBG-460N periodically updates this information. IP multicasting can be enabled/disabled on the NBG-460N LAN and/or WAN interfaces in the web configurator (**LAN**; **WAN**). Select **None** to disable IP multicasting on these interfaces.

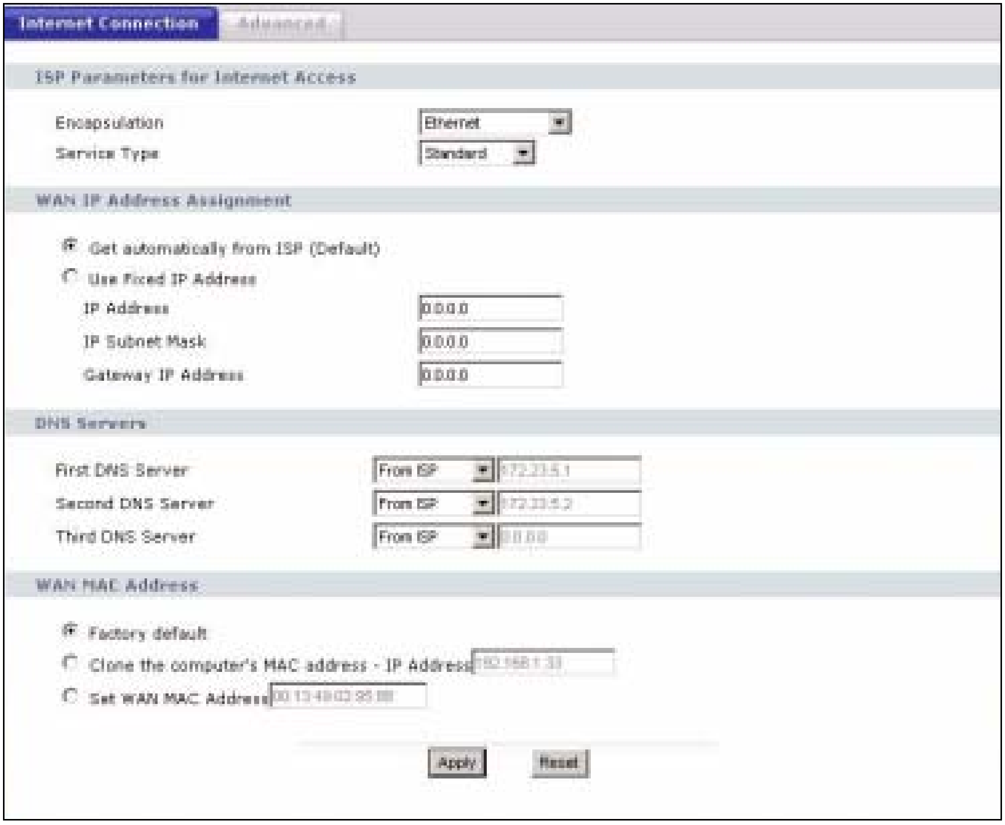
8.4 Internet Connection

Use this screen to change your NBG-460N’s Internet access settings. Click **Network** > **WAN**. The screen differs according to the encapsulation you choose.

8.4.1 Ethernet Encapsulation

This screen displays when you select **Ethernet** encapsulation.

Figure 78 Network > WAN > Internet Connection: Ethernet Encapsulation



ISP Parameters for Internet Access

Encapsulation: Ethernet
Service Type: Standard

WAN IP Address Assignment

● Get automatically from ISP (Default)
○ Use Fixed IP Address
IP Address: 0.0.0.0
IP Subnet Mask: 0.0.0.0
Gateway IP Address: 0.0.0.0

DNS Servers

First DNS Server: From ISP 172.23.5.1
Second DNS Server: From ISP 172.23.5.2
Third DNS Server: From ISP 0.0.0.0

WAN MAC Address

● Factory default
○ Clone the computer's MAC address - IP Address 192.168.1.33
○ Set WAN MAC Address 00:13:49:02:95:88

The following table describes the labels in this screen.

Table 43 Network > WAN > Internet Connection: Ethernet Encapsulation

LABEL	DESCRIPTION
Encapsulation	You must choose the Ethernet option when the WAN port is used as a regular Ethernet.
Service Type	Choose from **Standard**, **RR-Telstra** (RoadRunner Telstra authentication method), **RR-Manager** (Roadrunner Manager authentication method), **RR-Toshiba** (Roadrunner Toshiba authentication method) or **Telia Login**. The following fields do not appear with the **Standard** service type.
WAN IP Address Assignment	
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
IP Subnet Mask	Enter the **IP Subnet Mask** in this field.
Gateway IP Address	Enter a **Gateway IP Address** (if your ISP gave you one) in this field.
DNS Servers	
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the NBG-460N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the NBG-460N's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer's MAC address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

8.4.2 PPPoE Encapsulation

The NBG-460N supports PPPoE (Point-to-Point Protocol over Ethernet). PPPoE is an IETF standard (RFC 2516) specifying how a personal computer (PC) interacts with a broadband modem (DSL, cable, wireless, etc.) connection. The **PPP over Ethernet** option is for a dial-up connection using PPPoE.

For the service provider, PPPoE offers an access and authentication method that works with existing access control systems (for example Radius).

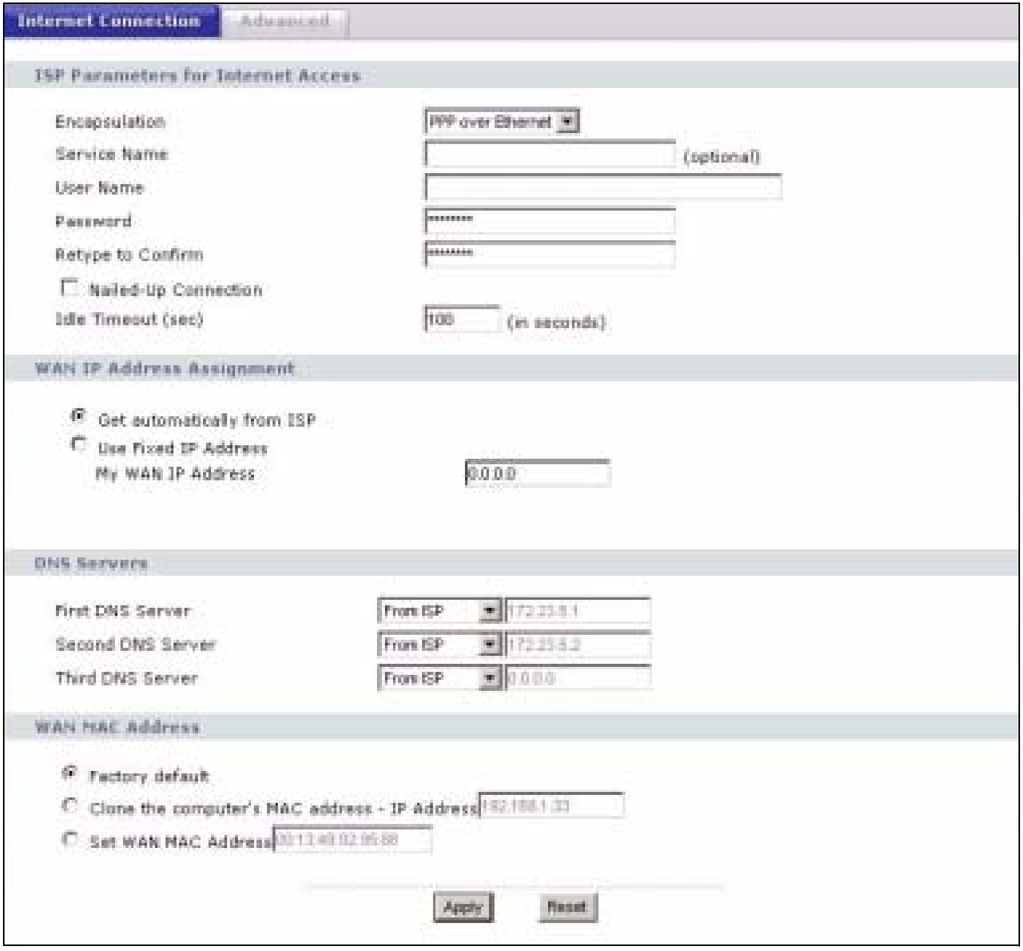
One of the benefits of PPPoE is the ability to let you access one of multiple network services, a function known as dynamic service selection. This enables the service provider to easily create and offer new IP services for individuals.

Operationally, PPPoE saves significant effort for both you and the ISP or carrier, as it requires no specific configuration of the broadband modem at the customer site.

By implementing PPPoE directly on the NBG-460N (rather than individual computers), the computers on the LAN do not need PPPoE software installed, since the NBG-460N does that part of the task. Furthermore, with NAT, all of the LANs' computers will have access.

This screen displays when you select **PPPoE** encapsulation.

Figure 79 Network > WAN > Internet Connection: PPPoE Encapsulation



ISP Parameters for Internet Access

Encapsulation	PPP over Ethernet
Service Name	(optional)
User Name	
Password	********
Retype to Confirm	********
□ Nailed-Up Connection	
Idle Timeout (sec)	100 (in seconds)

WAN IP Address Assignment

● Get automatically from ISP

○ Use Fixed IP Address

My WAN IP Address 0.0.0.0

DNS Servers

First DNS Server	From ISP	172.23.5.1
Second DNS Server	From ISP	172.23.5.2
Third DNS Server	From ISP	0.0.0.0

WAN MAC Address

● Factory default

○ Clone the computer's MAC address - IP Address 192.168.1.33

○ Set WAN MAC Address 00:13:49:02:95:88

The following table describes the labels in this screen.

Table 44 Network > WAN > Internet Connection: PPPoE Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Encapsulation	The **PPP over Ethernet** choice is for a dial-up connection using PPPoE. The NBG-460N supports PPPoE (Point-to-Point Protocol over Ethernet). PPPoE is an IETF Draft standard (RFC 2516) specifying how a personal computer (PC) interacts with a broadband modem (i.e. xDSL, cable, wireless, etc.) connection. Operationally, PPPoE saves significant effort for both the end user and ISP/carrier, as it requires no specific configuration of the broadband modem at the customer site. By implementing PPPoE directly on the router rather than individual computers, the computers on the LAN do not need PPPoE software installed, since the router does that part of the task. Further, with NAT, all of the LAN's computers will have access.
Service Name	Type the PPPoE service name provided to you. PPPoE uses a service name to identify and reach the PPPoE server.
User Name	Type the user name given to you by your ISP.
Password	Type the password associated with the user name above.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.
Nailed-Up Connection	Select **Nailed-Up Connection** if you do not want the connection to time out.
Idle Timeout	This value specifies the time in seconds that elapses before the router automatically disconnects from the PPPoE server.
WAN IP Address Assignment	
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My WAN IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
DNS Servers	
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the NBG-460N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by using the NBG-460N's MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer's MAC address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.

Table 44 Network > WAN > Internet Connection: PPPoE Encapsulation

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

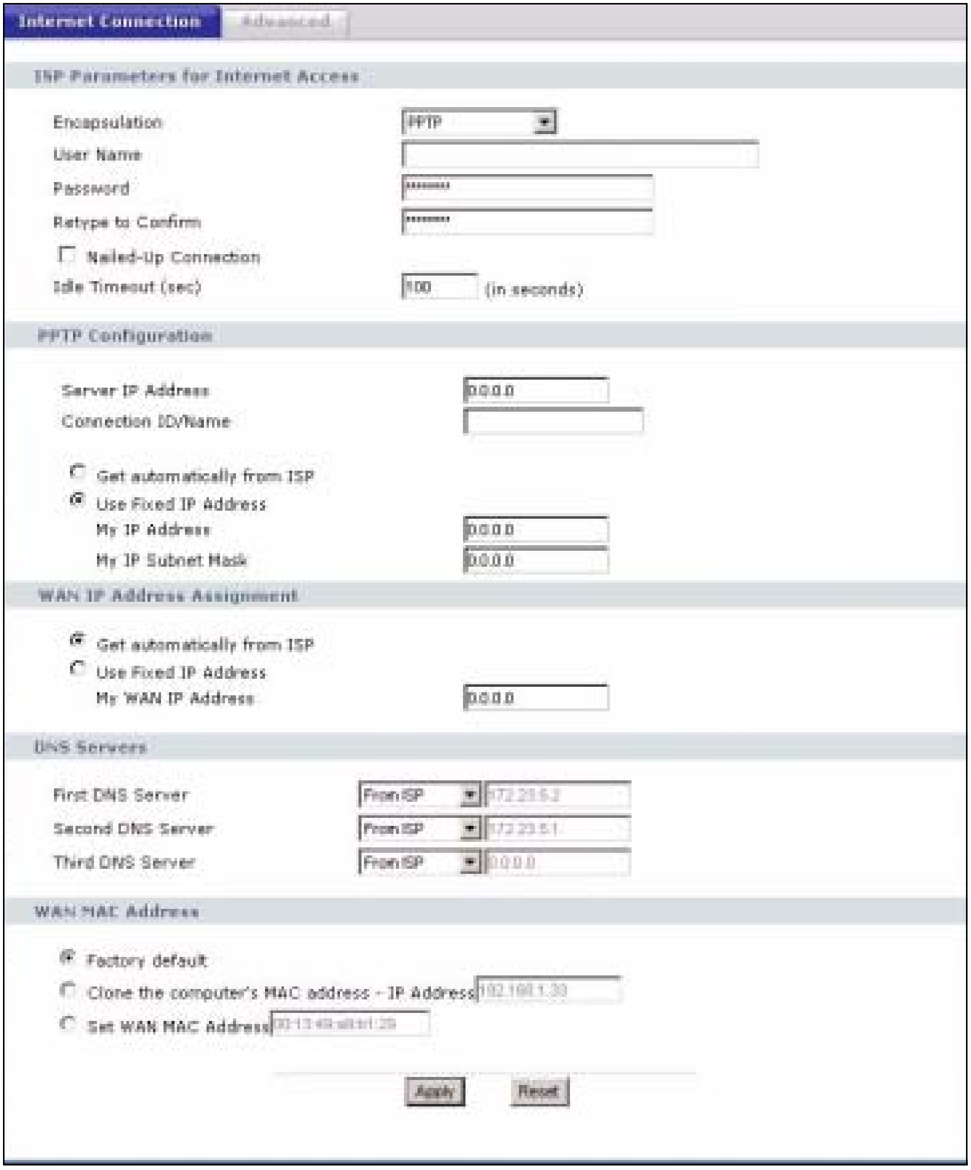
8.4.3 PPTP Encapsulation

Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks.

PPTP supports on-demand, multi-protocol and virtual private networking over public networks, such as the Internet.

This screen displays when you select **PPTP** encapsulation.

Figure 80 Network > WAN > Internet Connection: PPTP Encapsulation



ISP Parameters for Internet Access

Encapsulation	PPTP
User Name	
Password	********
Retype to Confirm	********
□ Nailed-Up Connection	
Idle Timeout (sec)	100 (in seconds)

PPTP Configuration

Server IP Address	0.0.0.0
Connection ID/Name	
○ Get automatically from ISP	
● Use Fixed IP Address	
My IP Address	0.0.0.0
My IP Subnet Mask	0.0.0.0

WAN IP Address Assignment

● Get automatically from ISP	
○ Use Fixed IP Address	
My WAN IP Address	0.0.0.0

DNS Servers

First DNS Server	From ISP	172.23.5.2
Second DNS Server	From ISP	172.23.5.1
Third DNS Server	From ISP	0.0.0.0

WAN MAC Address

● Factory default

○ Clone the computer's MAC address - IP Address 192.168.1.33

○ Set WAN MAC Address 00:13:49:a8:e1:28

The following table describes the labels in this screen.

Table 45 Network > WAN > Internet Connection: PPTP Encapsulation

LABEL	DESCRIPTION
ISP Parameters for Internet Access	
Encapsulation	Point-to-Point Tunneling Protocol (PPTP) is a network protocol that enables secure transfer of data from a remote client to a private server, creating a Virtual Private Network (VPN) using TCP/IP-based networks. PPTP supports on-demand, multi-protocol, and virtual private networking over public networks, such as the Internet. The NBG-460N supports only one PPTP server connection at any given time. To configure a PPTP client, you must configure the **User Name** and **Password** fields for a PPP connection and the PPTP parameters for a PPTP connection.
User Name	Type the user name given to you by your ISP.

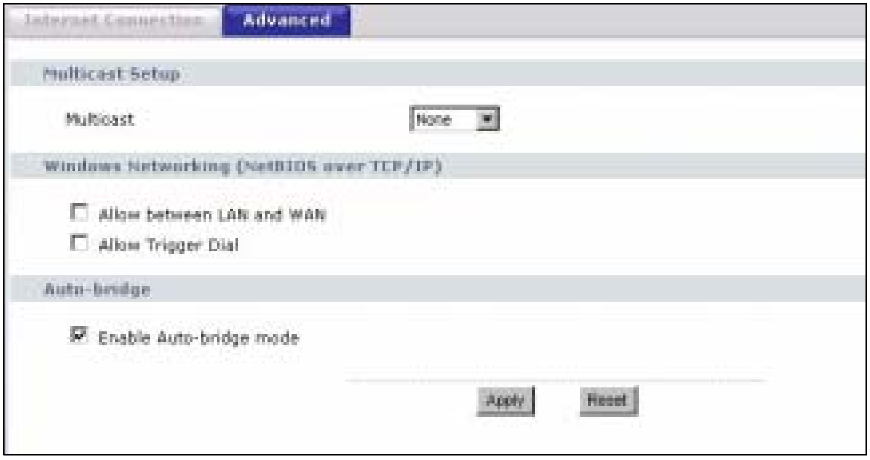
Table 45 Network > WAN > Internet Connection: PPTP Encapsulation

LABEL	DESCRIPTION
Password	Type the password associated with the User Name above.
Retype to Confirm	Type your password again to make sure that you have entered is correctly.
Nailed-up Connection	Select **Nailed-Up Connection** if you do not want the connection to time out.
Idle Timeout	This value specifies the time in seconds that elapses before the NBG-460N automatically disconnects from the PPTP server.
PPTP Configuration	
Server IP Address	Type the IP address of the PPTP server.
Connection ID/Name	Type your identification name for the PPTP server.
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My IP Address	Type the (static) IP address assigned to you by your ISP.
My IP Subnet Mask	Your NBG-460N will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the NBG-460N.
WAN IP Address Assignment	
Get automatically from ISP	Select this option If your ISP did not assign you a fixed IP address. This is the default selection.
Use Fixed IP Address	Select this option If the ISP assigned a fixed IP address.
My WAN IP Address	Enter your WAN IP address in this field if you selected **Use Fixed IP Address**.
DNS Servers	
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the NBG-460N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
WAN MAC Address	The MAC address section allows users to configure the WAN port's MAC address by either using the NBG-460N’s MAC address, copying the MAC address from a computer on your LAN or manually entering a MAC address.
Factory default	Select **Factory default** to use the factory assigned default MAC Address.
Clone the computer’s MAC address	Select **Clone the computer's MAC address - IP Address** and enter the IP address of the computer on the LAN whose MAC you are cloning. Once it is successfully configured, the address will be copied to the rom file (ZyNOS configuration file). It will not change unless you change the setting or upload a different ROM file.
Set WAN MAC Address	Select this option and enter the MAC address you want to use.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

8.5 Advanced WAN Screen

To change your NBG-460N's advanced WAN settings, click **Network** > **WAN** > **Advanced**. The screen appears as shown.

Figure 81 Network > WAN > Advanced



Multicast Setup

Multicast: None

Windows Networking (NetBIOS over TCP/IP)

□ Allow between LAN and WAN

□ Allow Trigger Dial

Auto-bridge

☑ Enable Auto-bridge mode

The following table describes the labels in this screen.

Table 46 WAN > Advanced

LABEL	DESCRIPTION
Multicast Setup	
Multicast	Select **IGMP V-1**, **IGMP V-2** or **None**. IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group - it is not used to carry user data. IGMP version 2 (RFC 2236) is an improvement over version 1 (RFC 1112) but IGMP version 1 is still in wide use. If you would like to read more detailed information about interoperability between IGMP version 2 and version 1, please see sections 4 and 5 of RFC 2236.
Windows Networking (NetBIOS over TCP/IP): NetBIOS (Network Basic Input/Output System) are TCP or UDP broadcast packets that enable a computer to connect to and communicate with a LAN. For some dial-up services such as PPPoE or PPTP, NetBIOS packets cause unwanted calls. However it may sometimes be necessary to allow NetBIOS packets to pass through to the WAN in order to find a computer on the WAN.	
Allow between LAN and WAN	Select this check box to forward NetBIOS packets from the LAN to the WAN and from the WAN to the LAN. If your firewall is enabled with the default policy set to block WAN to LAN traffic, you also need to enable the default WAN to LAN firewall rule that forwards NetBIOS traffic. Clear this check box to block all NetBIOS packets going from the LAN to the WAN and from the WAN to the LAN.
Allow Trigger Dial	Select this option to allow NetBIOS packets to initiate calls.

Table 46 WAN > Advanced

LABEL	DESCRIPTION
Enable Auto-bridge mode	Select this option to have the NBG-460N switch to bridge mode automatically when the NBG-460N gets a WAN IP address in the range of 192.168.x.y (where x and y are from zero to nine) no matter what the LAN IP address is. This might happen if you put the NBG-460N behind a NAT router that assigns it this IP address. When the NBG-460N is in bridge mode, the NBG-460N acts as an AP and all the interfaces (LAN, WAN and WLAN) are bridged. In this mode, your NAT, DHCP server, firewall and bandwidth management (rules) on the NBG-460N are not available. You do not have to reconfigure them if you return to router mode. Note: The NBG-460N automatically turns back to **Router Mode** when the NBG-460N gets a WAN IP address that is not in the 192.168.x.y range. Auto-bridging only works under the following conditions: • The WAN IP must be 192.168.x.y (where x and y must be from zero to nine). If the LAN IP address and the WAN IP address are in the same subnet but x or y is greater than nine, the device operates in router mode (with firewall and bandwidth management available). • The device must be in **Router Mode** (see Chapter 24 on page 259 for more information) for auto-bridging to become active.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

9

LAN

This chapter describes how to configure LAN settings.

9.1 LAN Overview

A Local Area Network (LAN) is a shared communication system to which many computers are attached. A LAN is a computer network limited to the immediate area, usually the same building or floor of a building. The LAN screens can help you configure a LAN DHCP server, manage IP addresses, and partition your physical network into logical networks.

9.1.1 IP Pool Setup

The NBG-460N is pre-configured with a pool of 32 IP addresses starting from 192.168.1.33 to 192.168.1.64. This configuration leaves 31 IP addresses (excluding the NBG-460N itself) in the lower range (192.168.1.2 to 192.168.1.32) for other server computers, for instance, servers for mail, FTP, TFTP, web, etc., that you may have.

9.1.2 System DNS Servers

Refer to the IP address and subnet mask section in the **Connection Wizard** chapter.

9.2 LAN TCP/IP

The NBG-460N has built-in DHCP server capability that assigns IP addresses and DNS servers to systems that support DHCP client capability.

9.2.1 Factory LAN Defaults

The LAN parameters of the NBG-460N are preset in the factory with the following values:

- IP address of 192.168.1.1 with subnet mask of 255.255.255.0 (24 bits)
- DHCP server enabled with 32 client IP addresses starting from 192.168.1.33.

These parameters should work for the majority of installations. If your ISP gives you explicit DNS server address(es), read the embedded web configurator help regarding what fields need to be configured.

9.2.2 IP Address and Subnet Mask

Refer to the IP address and subnet mask section in the **Connection Wizard** chapter for this information.

9.2.3 Multicast

Traditionally, IP packets are transmitted in one of either two ways - Unicast (1 sender - 1 recipient) or Broadcast (1 sender - everybody on the network). Multicast delivers IP packets to a group of hosts on the network - not everybody and not just 1.

IGMP (Internet Group Management Protocol) is a network-layer protocol used to establish membership in a Multicast group - it is not used to carry user data. IGMP version 2 (RFC 2236) is an improvement over version 1 (RFC 1112) but IGMP version 1 is still in wide use. If you would like to read more detailed information about interoperability between IGMP version 2 and version 1, please see sections 4 and 5 of RFC 2236. The class D IP address is used to identify host groups and can be in the range 224.0.0.0 to 239.255.255.255. The address 224.0.0.0 is not assigned to any group and is used by IP multicast computers. The address 224.0.0.1 is used for query messages and is assigned to the permanent group of all IP hosts (including gateways). All hosts must join the 224.0.0.1 group in order to participate in IGMP. The address 224.0.0.2 is assigned to the multicast routers group.

The NBG-460N supports both IGMP version 1 (**IGMP-v1**) and IGMP version 2 (**IGMP-v2**). At start up, the NBG-460N queries all directly connected networks to gather group membership. After that, the NBG-460N periodically updates this information. IP multicasting can be enabled/disabled on the NBG-460N LAN and/or WAN interfaces in the web configurator (**LAN**; **WAN**). Select **None** to disable IP multicasting on these interfaces.

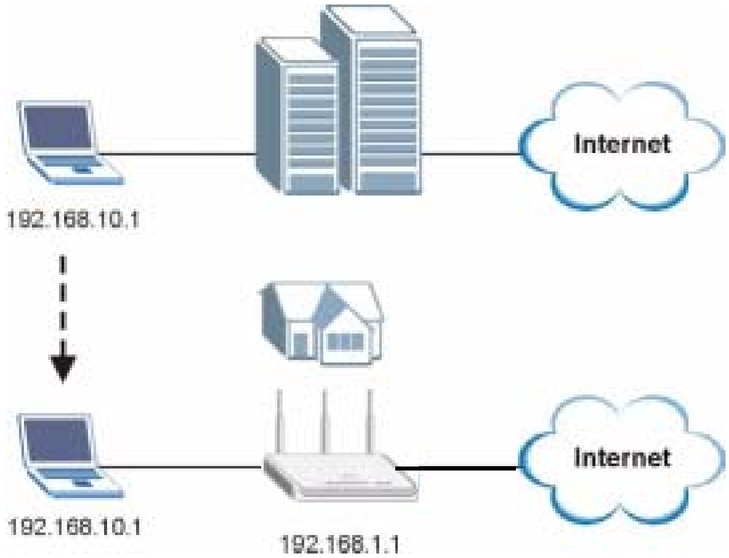
9.2.4 Any IP

Traditionally, you must set the IP addresses and the subnet masks of a computer and the NBG-460N to be in the same subnet to allow the computer to access the Internet (through the NBG-460N). In cases where your computer is required to use a static IP address in another network, you may need to manually configure the network settings of the computer every time you want to access the Internet via the NBG-460N.

With the Any IP feature and NAT enabled, the NBG-460N allows a computer to access the Internet without changing the network settings (such as IP address and subnet mask) of the computer, when the IP addresses of the computer and the NBG-460N are not in the same subnet. Whether a computer is set to use a dynamic or static (fixed) IP address, you can simply connect the computer to the NBG-460N and access the Internet.

The following figure depicts a scenario where a computer is set to use a static private IP address in the corporate environment. In a residential house where a NBG-460N is installed, you can still use the computer to access the Internet without changing the network settings, even when the IP addresses of the computer and the NBG-460N are not in the same subnet.

Figure 82 Any IP Example



The Any IP feature does not apply to a computer using either a dynamic IP address or a static IP address that is in the same subnet as the NBG-460N's IP address.

You *must* enable NAT to use the Any IP feature on the NBG-460N.

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address, also known as a Media Access Control or MAC address, on the local area network. IP routing table is defined on IP Ethernet devices (the NBG-460N) to decide which hop to use, to help forward data along to its specified destination.

The following lists out the steps taken, when a computer tries to access the Internet for the first time through the NBG-460N.

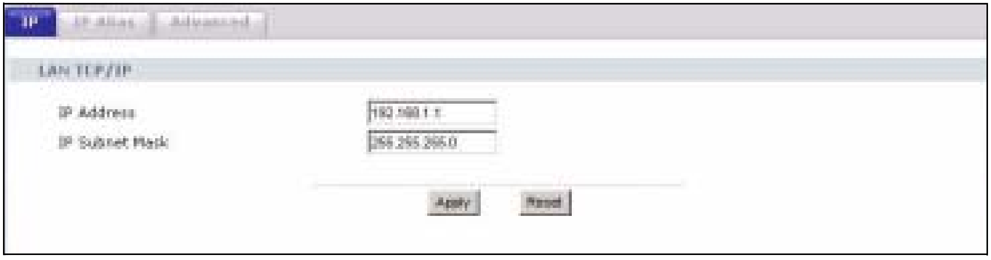
1. When a computer (which is in a different subnet) first attempts to access the Internet, it sends packets to its default gateway (which is not the NBG-460N) by looking at the MAC address in its ARP table.
2. When the computer cannot locate the default gateway, an ARP request is broadcast on the LAN.
3. The NBG-460N receives the ARP request and replies to the computer with its own MAC address.
4. The computer updates the MAC address for the default gateway to the ARP table. Once the ARP table is updated, the computer is able to access the Internet through the NBG-460N.
5. When the NBG-460N receives packets from the computer, it creates an entry in the IP routing table so it can properly forward packets intended for the computer.

After all the routing information is updated, the computer can access the NBG-460N and the Internet as if it is in the same subnet as the NBG-460N.

9.3 LAN IP Screen

Use this screen to change your basic LAN settings. Click **Network** > **LAN**.

Figure 83 Network > LAN > IP



LAN TCP/IP

IP Address: 192.168.1.1

IP Subnet Mask: 255.255.255.0

The following table describes the labels in this screen.

Table 47 Network > LAN > IP

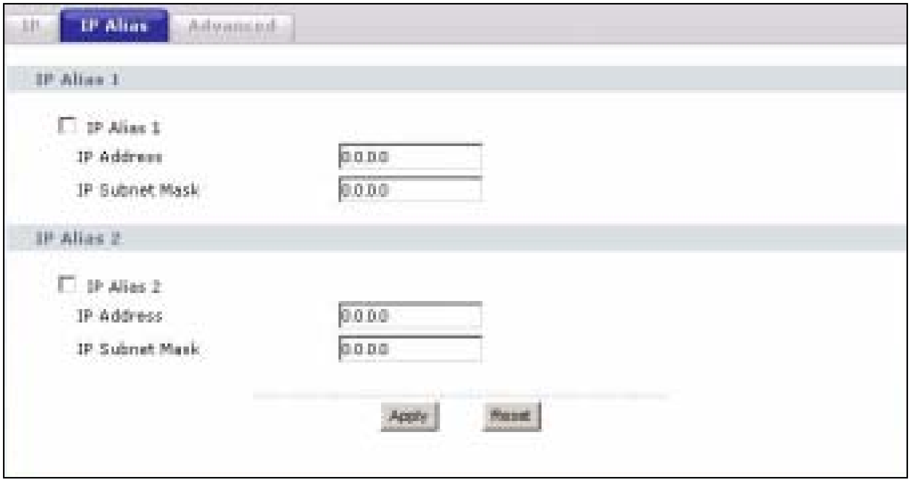
LABEL	DESCRIPTION
LAN TCP/IP	
IP Address	Type the IP address of your NBG-460N in dotted decimal notation 192.168.1.1 (factory default).
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your NBG-460N will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the NBG-460N.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

9.4 LAN IP Alias

IP alias allows you to partition a physical network into different logical networks over the same Ethernet interface. The NBG-460N supports three logical LAN interfaces via its single physical Ethernet interface with the NBG-460N itself as the gateway for each LAN network.

To change your NBG-460N's IP alias settings, click **Network** > **LAN** > **IP Alias**. The screen appears as shown.

Figure 84 Network > LAN > IP Alias



IP Alias 1

□ IP Alias 1

IP Address 0.0.0.0

IP Subnet Mask 0.0.0.0

IP Alias 2

□ IP Alias 2

IP Address 0.0.0.0

IP Subnet Mask 0.0.0.0

The following table describes the labels in this screen.

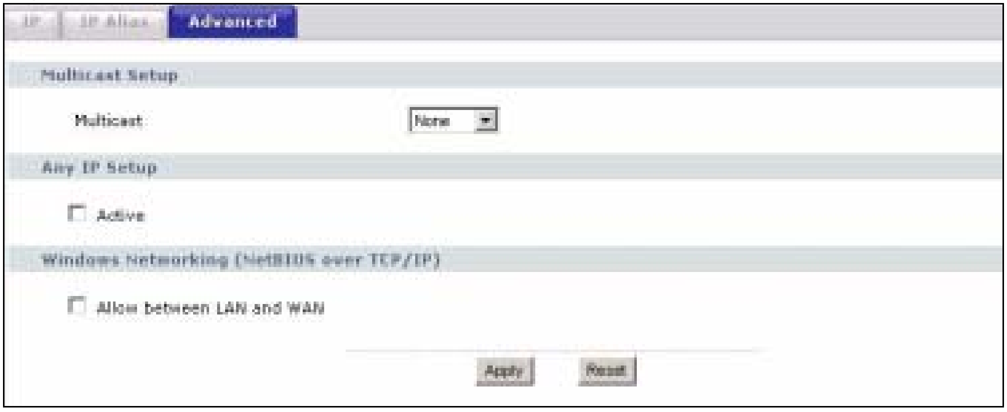
Table 48 Network > LAN > IP Alias

LABEL	DESCRIPTION
IP Alias 1,2	Select the check box to configure another LAN network for the NBG-460N.
IP Address	Enter the IP address of your NBG-460N in dotted decimal notation.
IP Subnet Mask	Your NBG-460N will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the NBG-460N.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

9.5 Advanced LAN Screen

To change your NBG-460N’s advanced IP settings, click **Network** > **LAN** > **Advanced**. The screen appears as shown.

Figure 85 Network > LAN > Advanced



Multicast Setup

Multicast None

Any IP Setup

□ Active

Windows Networking (NetBIOS over TCP/IP)

□ Allow between LAN and WAN

The following table describes the labels in this screen.

Table 49 Network > LAN > Advanced

LABEL	DESCRIPTION
Multicast	Select **IGMP V-1** or **IGMP V-2** or **None**. IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group - it is not used to carry user data. IGMP version 2 (RFC 2236) is an improvement over version 1 (RFC 1112) but IGMP version 1 is still in wide use. If you would like to read more detailed information about interoperability between IGMP version 2 and version 1, please see sections 4 and 5 of RFC 2236.
Any IP Setup	
Active	Select this if you want to let computers on different subnets use the NBG-460N.
Windows Networking (NetBIOS over TCP/IP): NetBIOS (Network Basic Input/Output System) are TCP or UDP broadcast packets that enable a computer to connect to and communicate with a LAN. For some dial-up services such as PPPoE or PPTP, NetBIOS packets cause unwanted calls. However it may sometimes be necessary to allow NetBIOS packets to pass through to the WAN in order to find a computer on the WAN.	
Allow between LAN and WAN	Select this check box to forward NetBIOS packets from the LAN to the WAN and from the WAN to the LAN. If your firewall is enabled with the default policy set to block WAN to LAN traffic, you also need to enable the default WAN to LAN firewall rule that forwards NetBIOS traffic. Clear this check box to block all NetBIOS packets going from the LAN to the WAN and from the WAN to the LAN.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

10

DHCP

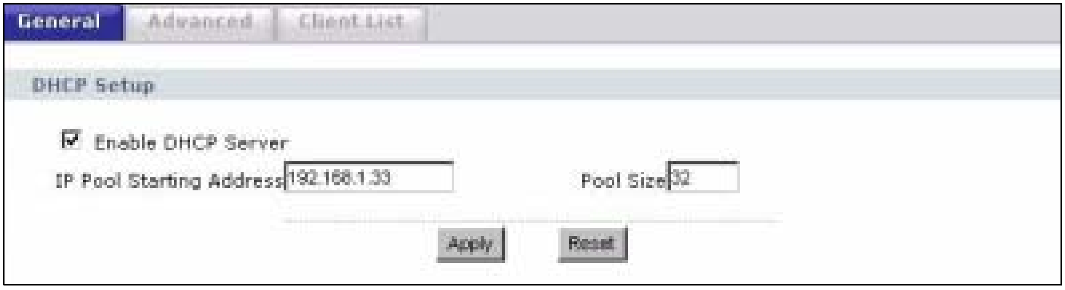
10.1 DHCP

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the NBG-460N's LAN as a DHCP server or disable it. When configured as a server, the NBG-460N provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on your LAN, or else the computer must be manually configured.

10.2 DHCP General Screen

Click **Network** > **DHCP**. The following screen displays.

Figure 86 Network > DHCP > General



DHCP Setup

☑ Enable DHCP Server

IP Pool Starting Address 192.168.1.33

Pool Size 32

The following table describes the labels in this screen.

Table 50 Network > DHCP > General

LABEL	DESCRIPTION
LAN DHCP Setup	
Enable DHCP Server	Enable or Disable DHCP for LAN. DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients (computers) to obtain TCP/IP configuration at startup from a server. Leave the **Enable DHCP Server** check box selected unless your ISP instructs you to do otherwise. Clear it to disable the NBG-460N acting as a DHCP server. When configured as a server, the NBG-460N provides TCP/IP configuration for the clients. If not, DHCP service is disabled and you must have another DHCP server on your LAN, or else the computers must be manually configured. When set as a server, fill in the following four fields.
IP Pool Starting Address	This field specifies the first of the contiguous addresses in the IP address pool for LAN.
Pool Size	This field specifies the size, or count of the IP address pool for LAN.

Table 50 Network > DHCP > General

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

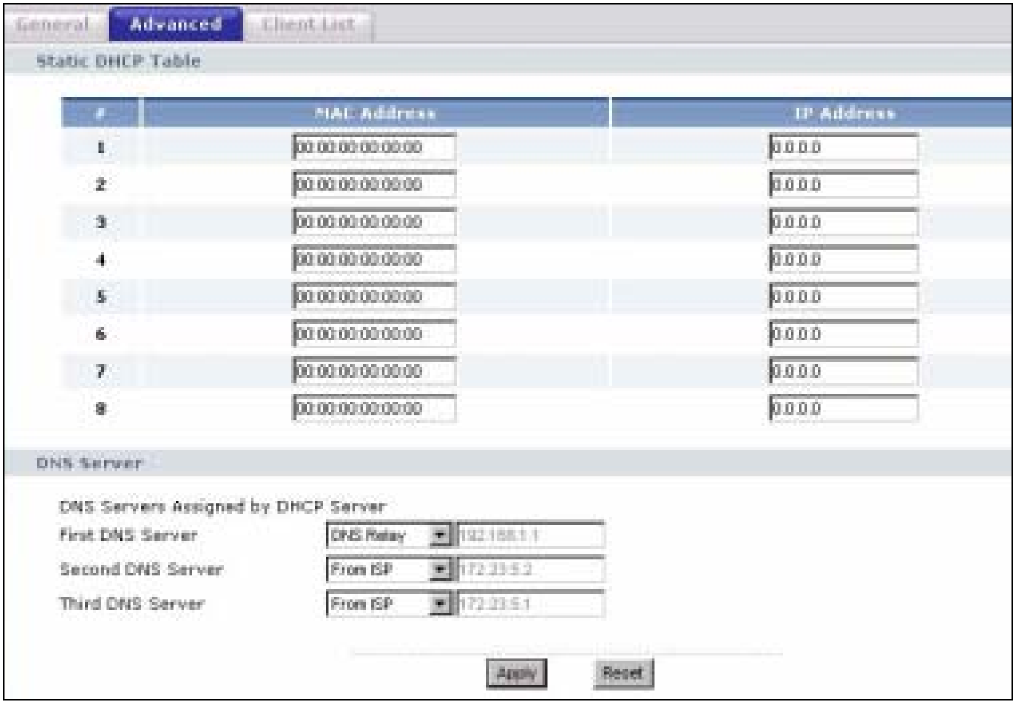
10.3 DHCP Advanced Screen

This screen allows you to assign IP addresses on the LAN to specific individual computers based on their MAC addresses. You can also use this screen to configure the DNS server information that the NBG-460N sends to the DHCP clients.

Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.

To change your NBG-460N’s static DHCP settings, click **Network** > **DHCP** > **Advanced**. The following screen displays.

Figure 87 Network > DHCP > Advanced



Static DHCP Table

#	MAC Address	IP Address
1	00:00:00:00:00:00	0.0.0.0
2	00:00:00:00:00:00	0.0.0.0
3	00:00:00:00:00:00	0.0.0.0
4	00:00:00:00:00:00	0.0.0.0
5	00:00:00:00:00:00	0.0.0.0
6	00:00:00:00:00:00	0.0.0.0
7	00:00:00:00:00:00	0.0.0.0
8	00:00:00:00:00:00	0.0.0.0

DNS Server

DNS Servers Assigned by DHCP Server

First DNS Server	DNS Relay	192.168.1.1
Second DNS Server	From ISP	172.23.5.2
Third DNS Server	From ISP	172.23.5.1

The following table describes the labels in this screen.

Table 51 Network > DHCP > Advanced

LABEL	DESCRIPTION
Static DHCP Table	
#	This is the index number of the static IP table entry (row).
MAC Address	Type the MAC address (with colons) of a computer on your LAN.
IP Address	Type the LAN IP address of a computer on your LAN.

Table 51 Network > DHCP > Advanced

LABEL	DESCRIPTION
DNS Server	
DNS Servers Assigned by DHCP Server	The NBG-460N passes a DNS (Domain Name System) server IP address (in the order you specify here) to the DHCP clients. The NBG-460N only passes this information to the LAN DHCP clients when you select the **Enable DHCP Server** check box. When you clear the **Enable DHCP Server** check box, DHCP service is disabled and you must have another DHCP sever on your LAN, or else the computers must have their DNS server addresses manually configured.
First DNS Server Second DNS Server Third DNS Server	Select **From ISP** if your ISP dynamically assigns DNS server information (and the NBG-460N's WAN IP address). The field to the right displays the (read-only) DNS server IP address that the ISP assigns. Select **User-Defined** if you have the IP address of a DNS server. Enter the DNS server's IP address in the field to the right. If you chose **User-Defined**, but leave the IP address set to 0.0.0.0, **User-Defined** changes to **None** after you click **Apply**. If you set a second choice to **User-Defined**, and enter the same IP address, the second **User-Defined** changes to **None** after you click **Apply**. Select **DNS Relay** to have the NBG-460N act as a DNS proxy. The NBG-460N's LAN IP address displays in the field to the right (read-only). The NBG-460N tells the DHCP clients on the LAN that the NBG-460N itself is the DNS server. When a computer on the LAN sends a DNS query to the NBG-460N, the NBG-460N forwards the query to the NBG-460N's system DNS server (configured in the **WAN > Internet Connection** screen) and relays the response back to the computer. You can only select **DNS Relay** for one of the three servers; if you select **DNS Relay** for a second or third DNS server, that choice changes to **None** after you click **Apply**. Select **None** if you do not want to configure DNS servers. If you do not configure a DNS server, you must know the IP address of a computer in order to access it.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

10.4 Client List Screen

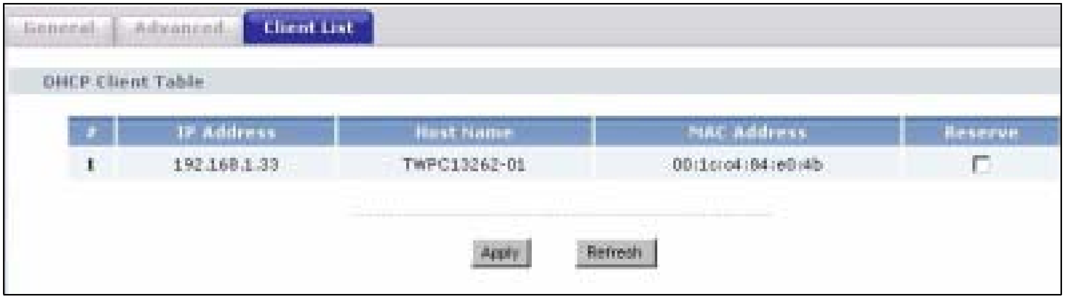
The DHCP table shows current DHCP client information (including **IP Address**, **Host Name** and **MAC Address**) of network clients using the NBG-460N’s DHCP servers.

Configure this screen to always assign an IP address to a MAC address (and host name). Click **Network** > **DHCP Server** > **Client List**.

You can also view a read-only client list by clicking the **DHCP Table (Details...)** hyperlink in the **Status** screen.

The following screen displays.

Figure 88 Network > DHCP > Client List



DHCP Client Table

#	IP Address	Host Name	MAC Address	Reserve
1	192.168.1.33	TWPC13262-01	00:1c:c4:84:e0:4b	□

The following table describes the labels in this screen.

Table 52 Network > DHCP > Client List

LABEL	DESCRIPTION
#	This is the index number of the host computer.
IP Address	This field displays the IP address relative to the # field listed above.
Host Name	This field displays the computer host name.
MAC Address	The MAC (Media Access Control) or Ethernet address on a LAN (Local Area Network) is unique to your computer (six pairs of hexadecimal notation). A network interface card such as an Ethernet adapter has a hardwired address that is assigned at the factory. This address follows an industry standard that ensures no other adapter has a similar address.
Reserve	Select this check box in the **DHCP Setup** section to have the NBG-460N always assign the IP address(es) to the MAC address(es) (and host name(s)). After you click **Apply**, the MAC address and IP address also display in the **Advanced** screen (where you can edit them).
Apply	Click **Apply** to save your settings.
Refresh	Click **Refresh** to reload the DHCP table.

11

Network Address Translation (NAT)

This chapter discusses how to configure NAT on the NBG-460N.

11.1 NAT Overview

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet. For example, the source address of an outgoing packet, used within one network is changed to a different IP address known within another network.

11.2 Using NAT

You must create a firewall rule in addition to setting up NAT, to allow traffic from the WAN to be forwarded through the NBG-460N.

11.2.1 Port Forwarding: Services and Port Numbers

A port forwarding set is a list of inside (behind NAT on the LAN) servers, for example, web or FTP, that you can make accessible to the outside world even though NAT makes your whole inside network appear as a single machine to the outside world.

Use the **Application** screen to forward incoming service requests to the server(s) on your local network. You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers.

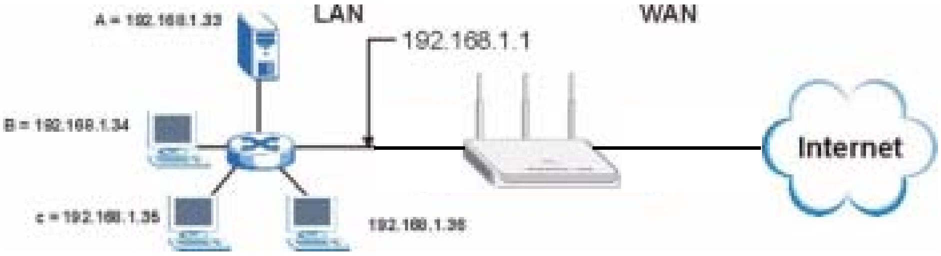
In addition to the servers for specified services, NAT supports a default server. A service request that does not have a server explicitly designated for it is forwarded to the default server. If the default is not defined, the service request is simply discarded.

Many residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to your ISP.

11.2.2 Configuring Servers Behind Port Forwarding Example

Let's say you want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 192.168.1.35 to a third (**C** in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

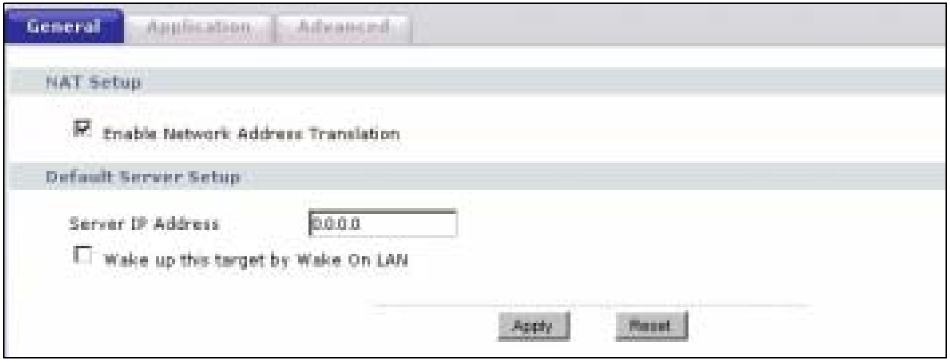
Figure 89 Multiple Servers Behind NAT Example



11.3 General NAT Screen

Click **Network** > **NAT** to open the **General** screen.

Figure 90 Network > NAT > General



NAT Setup

☑ Enable Network Address Translation

Default Server Setup

Server IP Address 0.0.0.0

□ Wake up this target by Wake On LAN

The following table describes the labels in this screen.

Table 53 Network > NAT > General

LABEL	DESCRIPTION
Enable Network Address Translation	Network Address Translation (NAT) allows the translation of an Internet protocol address used within one network (for example a private IP address used in a local network) to a different IP address known within another network (for example a public IP address used on the Internet). Select the check box to enable NAT.
Default Server Setup	
Server IP Address	In addition to the servers for specified services, NAT supports a default server. A default server receives packets from ports that are not specified in the **Application** screen. If you do not assign a **Default Server IP address**, the NBG-460N discards all packets received for ports that are not specified in the **Application** screen or remote management.
Wake up this target by Wake On LAN	Select this to use WoL (Wake On LAN) to turn on the server specified in the **Server IP Address** field when packets are received on ports not specified in the **Application** screen. Note: For more information on Wake On LAN see Section 22.4 on page 255.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

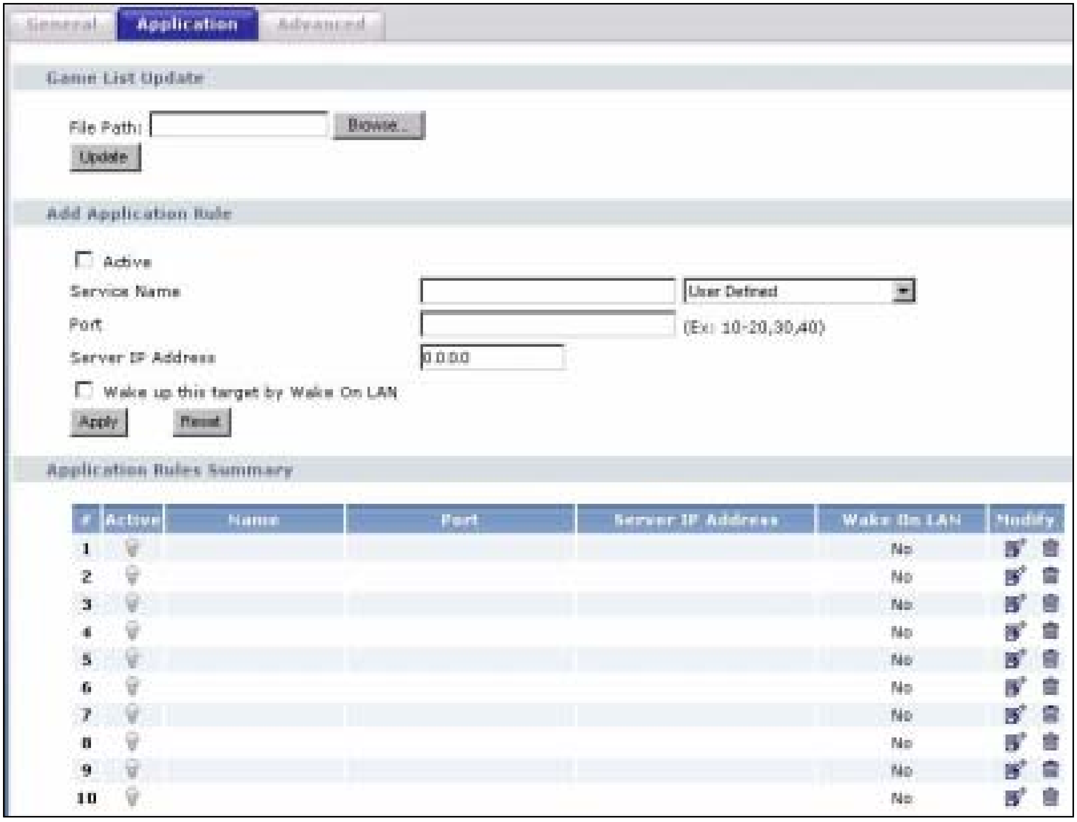
11.4 NAT Application Screen

Port forwarding allows you to define the local servers to which the incoming services will be forwarded. To change your NBG-460N's port forwarding settings, click **Network** > **NAT** > **Application**. The screen appears as shown.

If you do not assign a **Default Server IP address** in the **NAT > General** screen, the NBG-460N discards all packets received for ports that are not specified in this screen or remote management.

Refer to Appendix F on page 321 for port numbers commonly used for particular services.

Figure 91 Network > NAT > Application



General | Application | Advanced

Game List Update

File Path: [ ] Browse...

Update

Add Application Rule

□ Active

Service Name [ ] [User Defined ▾]

Port [ ] (Ex: 10-20,30,40)

Server IP Address [0.0.0.0]

□ Wake up this target by Wake On LAN

Apply Reset

Application Rules Summary

#	Active	Name	Port	Server IP Address	Wake On LAN	Modify
1	○				No	✎ 🗑
2	○				No	✎ 🗑
3	○				No	✎ 🗑
4	○				No	✎ 🗑
5	○				No	✎ 🗑
6	○				No	✎ 🗑
7	○				No	✎ 🗑
8	○				No	✎ 🗑
9	○				No	✎ 🗑
10	○				No	✎ 🗑

The following table describes the labels in this screen.

Table 54 NAT Application

LABEL	DESCRIPTION
Game List Update	A game list includes the pre-defined service name(s) and port number(s). You can edit and upload it to the NBG-460N to replace the existing entries in the second field next to **Service Name**.
File Path	Type in the location of the file you want to upload in this field or click **Browse...** to find it.
Browse...	Click **Browse...** to find the.txt file you want to upload. Remember that you must decompress compressed (.zip) files before you can upload them.
Update	Click **Update** to begin the upload process. This process may take up to two minutes.
Add Application Rule	
Active	Select the check box to enable this rule and the requested service can be forwarded to the host with a specified internal IP address. Clear the checkbox to disallow forwarding of these ports to an inside server without having to delete the entry.
Service Name	Type a name (of up to 31 printable characters) to identify this rule in the first field next to **Service Name**. Otherwise, select a predefined service in the second field next to **Service Name**. The predefined service name and port number(s) will display in the **Service Name** and **Port** fields.

Table 54 NAT Application (continued)

LABEL	DESCRIPTION
Port	Type a port number(s) to be forwarded. To specify a range of ports, enter a hyphen (-) between the first port and the last port, such as 10-20. To specify two or more non-consecutive port numbers, separate them by a comma without spaces, such as 123,567.
Server IP Address	Type the inside IP address of the server that receives packets from the port(s) specified in the **Port** field.
Wake up this target by Wake On LAN	Select this to use WoL (Wake On LAN) to turn on the server specified in the **IP address** field when packets are received on the ports specified in the **Port** field. Note: For more information on Wake On LAN see Section 22.4 on page 255.
Apply	Click **Apply** to save your changes to the **Application Rules Summary** table.
Reset	Click **Reset** to not save and return your new changes in the **Service Name** and **Port** fields to the previous one.
Application Rules Summary	
#	This is the number of an individual port forwarding server entry.
Active	This icon is turned on when the rule is enabled.
Name	This field displays a name to identify this rule.
Port	This field displays the port number(s).
Server IP Address	This field displays the inside IP address of the server.
Wake On LAN	This field displays **No** when **Wake On LAN** is disabled and **Yes** when **Wake On LAN** is enabled.
Modify	Click the **Edit** icon to display and modify an existing rule setting in the fields under **Add Application Rule**. Click the **Remove** icon to delete a rule.

11.4.1 Game List Example

Here is an example game list text file. The index number, service name and associated port(s) are specified by semi-colons (no spaces). Use the name=xxx (where xxx is the service name) to create a new service. Port range can be separated with a hyphen (-) (no spaces). Multiple (non-consecutive) ports can be separated by commas.

Figure 92 Game List Example

```
version=1
1;name=Battlefield 1942;port=14567,22000,23000-23009,27900,28900
2;name=Call of Duty;port=28960
3;name=Civilization IV;port=2056
4;name=Diablo I and II;port=6112-6119,4000
5;name=Doom 3;port=27666
6;name=F.E.A.R;port=27888
7;name=Final Fantasy XI;port=25,80,110,443,50000-65535
8;name=Guild Wars;port=6112,80
9;name=Half Life;port=6003,7002,27005,27010,27011,27015
10;name=Jedi Knight III: Jedi Academy;port=28060-28062,28070-28081
11;name=Need for Speed: Hot Pursuit 2;port=1230,8511-
8512,27900,28900,61200-61230
12;name=Neverwinter Nights;port=5120-5300,6500,27900,28900
13;name=Quake 2;port=27910
14;name=Quake 3;port=27660,27960
15;name=Rainbow Six 3: Raven Shield;port=7777-7787,8777-8787
16;name=Serious Sam II;port=25600-25605
17;name=Silent Hunter III;port=17997-18003
18;name=Soldier of Fortune II;port=20100-20112
19;name=Starcraft;port=6112-6119,4000
20;name=Star Trek: Elite Force II;port=29250,29256
21;name=SWAT 4;port=10480-10483
22;name=Warcraft II and III;port=6112-6119,4000
23;name=World of Warcraft;port=3724
```

11.5 Trigger Port Forwarding

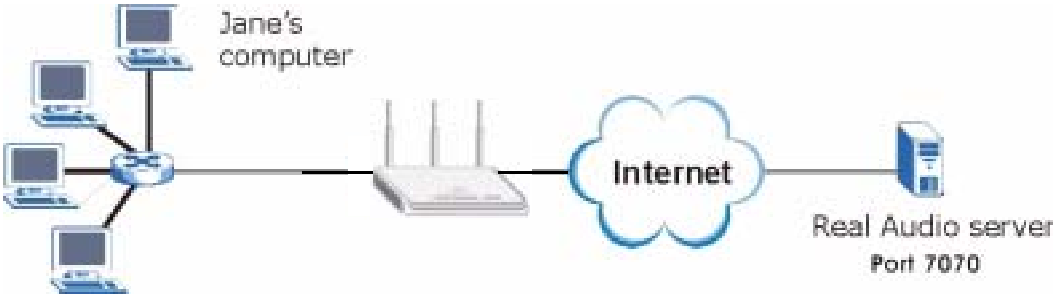
Some services use a dedicated range of ports on the client side and a dedicated range of ports on the server side. With regular port forwarding you set a forwarding port in NAT to forward a service (coming in from the server on the WAN) to the IP address of a computer on the client side (LAN). The problem is that port forwarding only forwards a service to a single LAN IP address. In order to use the same service on a different LAN computer, you have to manually replace the LAN computer's IP address in the forwarding port with another LAN computer's IP address.

Trigger port forwarding solves this problem by allowing computers on the LAN to dynamically take turns using the service. The NBG-460N records the IP address of a LAN computer that sends traffic to the WAN to request a service with a specific port number and protocol (a "trigger" port). When the NBG-460N's WAN port receives a response with a specific port number and protocol ("incoming" port), the NBG-460N forwards the traffic to the LAN IP address of the computer that sent the request. After that computer’s connection for that service closes, another computer on the LAN can use the service in the same manner. This way you do not need to configure a new IP address each time you want a different LAN computer to use the application.

11.5.1 Trigger Port Forwarding Example

The following is an example of trigger port forwarding.

Figure 93 Trigger Port Forwarding Process: Example



1. Jane requests a file from the Real Audio server (port 7070).
2. Port 7070 is a “trigger” port and causes the NBG-460N to record Jane’s computer IP address. The NBG-460N associates Jane's computer IP address with the "incoming" port range of 6970-7170.
3. The Real Audio server responds using a port number ranging between 6970-7170.
4. The NBG-460N forwards the traffic to Jane’s computer IP address.
5. Only Jane can connect to the Real Audio server until the connection is closed or times out. The NBG-460N times out in three minutes with UDP (User Datagram Protocol), or two hours with TCP/IP (Transfer Control Protocol/Internet Protocol).

11.5.2 Two Points To Remember About Trigger Ports

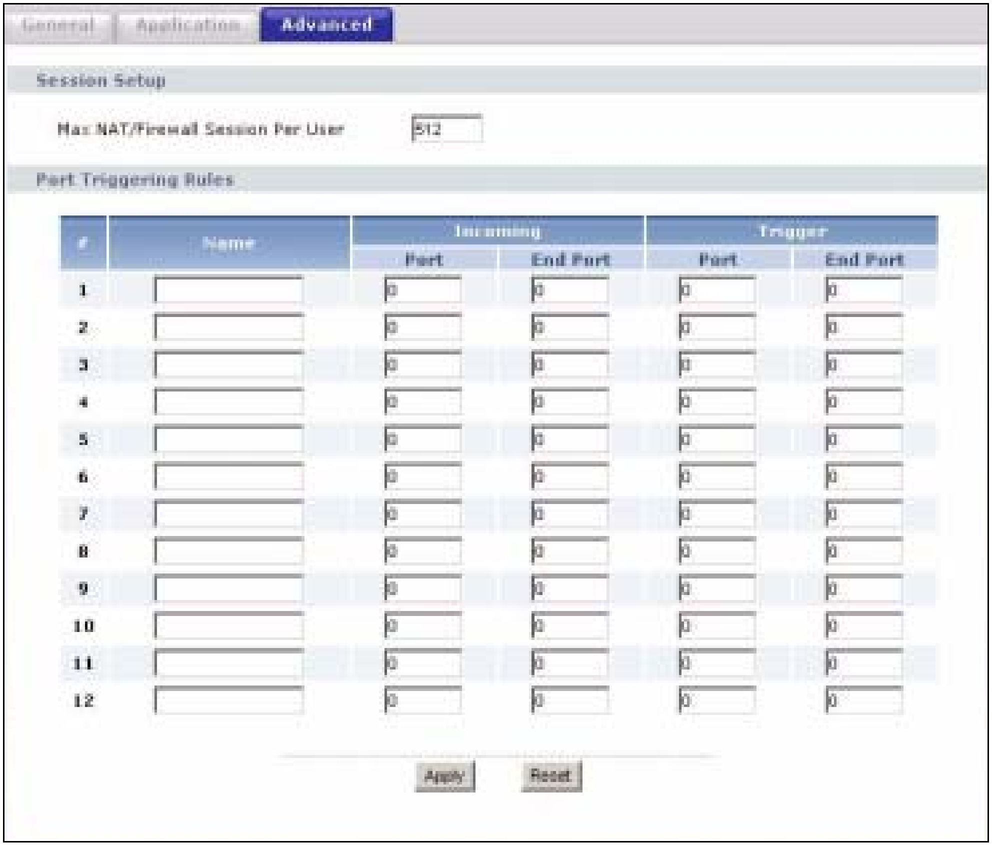
1. Trigger events only happen on data that is going coming from inside the NBG-460N and going to the outside.
2. If an application needs a continuous data stream, that port (range) will be tied up so that another computer on the LAN can’t trigger it.

11.6 NAT Advanced Screen

To change your NBG-460N’s trigger port settings, click **Network > NAT** > **Advanced**. The screen appears as shown.

✍ Only one LAN computer can use a trigger port (range) at a time.

Figure 94 Network > NAT > Advanced



Session Setup

Max NAT/Firewall Session Per User: 512

Port Triggering Rules

#	Name	Incoming		Trigger	
		Port	End Port	Port	End Port
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0

The following table describes the labels in this screen.

Table 55 Network > NAT > Advanced

LABEL	DESCRIPTION
Max NAT/Firewall Session Per User	Type a number ranging from 1 to 2048 to limit the number of NAT/firewall sessions that a host can create. When computers use peer to peer applications, such as file sharing applications, they may use a large number of NAT sessions. If you do not limit the number of NAT sessions a single client can establish, this can result in all of the available NAT sessions being used. In this case, no additional NAT sessions can be established, and users may not be able to access the Internet. Each NAT session establishes a corresponding firewall session. Use this field to limit the number of NAT/firewall sessions each client computer can establish through the NBG-460N. If your network has a small number of clients using peer to peer applications, you can raise this number to ensure that their performance is not degraded by the number of NAT sessions they can establish. If your network has a large number of users using peer to peer applications, you can lower this number to ensure no single client is using all of the available NAT sessions.
Port Triggering Rules	
#	This is the rule index number (read-only).
Name	Type a unique name (up to 15 characters) for identification purposes. All characters are permitted - including spaces.

Table 55 Network > NAT > Advanced

LABEL	DESCRIPTION
Incoming	Incoming is a port (or a range of ports) that a server on the WAN uses when it sends out a particular service. The NBG-460N forwards the traffic with this port (or range of ports) to the client computer on the LAN that requested the service.
Start Port	Type a port number or the starting port number in a range of port numbers.
End Port	Type a port number or the ending port number in a range of port numbers.
Trigger	The trigger port is a port (or a range of ports) that causes (or triggers) the NBG-460N to record the IP address of the LAN computer that sent the traffic to a server on the WAN.
Start Port	Type a port number or the starting port number in a range of port numbers.
End Port	Type a port number or the ending port number in a range of port numbers.
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.

12

Dynamic DNS

12.1 Dynamic DNS Introduction

Dynamic DNS allows you to update your current dynamic IP address with one or many dynamic DNS services so that anyone can contact you (in NetMeeting, CU-SeeMe, etc.). You can also access your FTP server or Web site on your own computer using a domain name (for instance myhost.dhs.org, where myhost is a name of your choice) that will never change instead of using an IP address that changes each time you reconnect. Your friends or relatives will always be able to call you even if they don't know your IP address.

First of all, you need to have registered a dynamic DNS account with www.dyndns.org. This is for people with a dynamic IP from their ISP or DHCP server that would still like to have a domain name. The Dynamic DNS service provider will give you a password or key.

12.1.1 DynDNS Wildcard

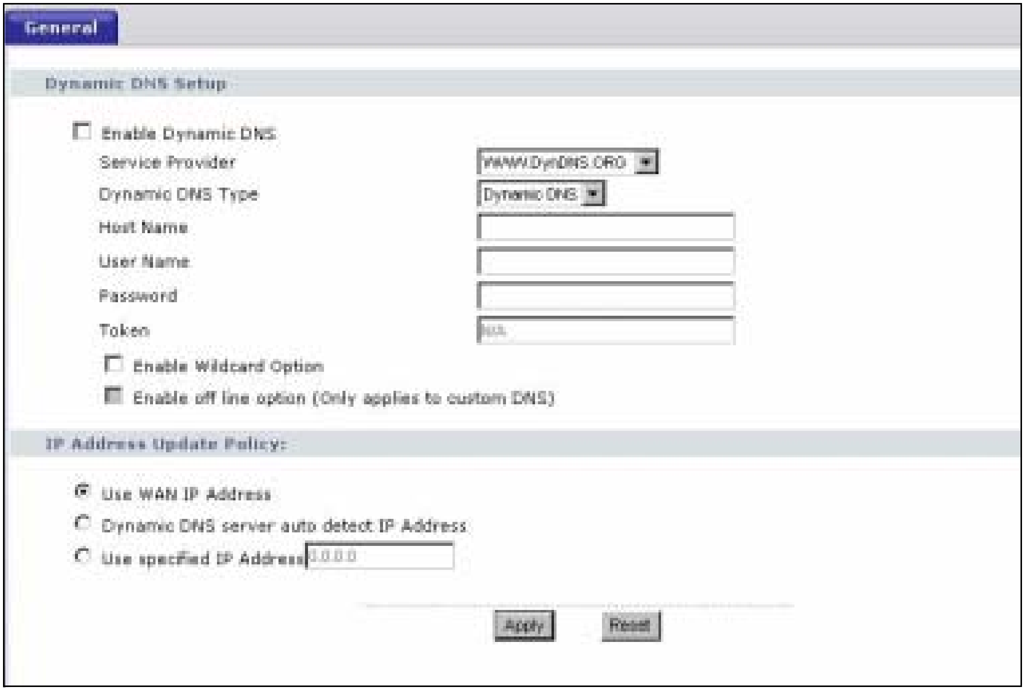
Enabling the wildcard feature for your host causes *.yourhost.dyndns.org to be aliased to the same IP address as yourhost.dyndns.org. This feature is useful if you want to be able to use, for example, www.yourhost.dyndns.org and still reach your hostname.

If you have a private WAN IP address, then you cannot use Dynamic DNS.

12.2 Dynamic DNS Screen

To change your NBG-460N's DDNS, click **Network** > **DDNS**. The screen appears as shown.

Figure 95 Dynamic DNS



Dynamic DNS Setup

□ Enable Dynamic DNS

Service Provider: WWW.DynDNS.ORG

Dynamic DNS Type: Dynamic DNS

Host Name

User Name

Password

Token: N/A

□ Enable Wildcard Option

■ Enable off line option (Only applies to custom DNS)

IP Address Update Policy:

● Use WAN IP Address

○ Dynamic DNS server auto detect IP Address

○ Use specified IP Address 0.0.0.0

The following table describes the labels in this screen.

Table 56 Dynamic DNS

LABEL	DESCRIPTION
Enable Dynamic DNS	Select this check box to use dynamic DNS.
Service Provider	Select the name of your Dynamic DNS service provider.
Dynamic DNS Type	Select the type of service that you are registered for from your Dynamic DNS service provider.
Host Name	Enter a host names in the field provided. You can specify up to two host names in the field separated by a comma (",").
User Name	Enter your user name.
Password	Enter the password assigned to you.
Token	Enter your client authorization key provided by the server to update DynDNS records. This field is configurable only when you select **WWW.REGFISH.COM** in the **Service Provider** field.
Enable Wildcard Option	Select the check box to enable DynDNS Wildcard.
Enable off line option	This option is available when **CustomDNS** is selected in the **DDNS Type** field. Check with your Dynamic DNS service provider to have traffic redirected to a URL (that you can specify) while you are off line.
IP Address Update Policy:	
Use WAN IP Address	Select this option to update the IP address of the host name(s) to the WAN IP address.
Dynamic DNS server auto detect IP Address	Select this option to update the IP address of the host name(s) automatically by the DDNS server. It is recommended that you select this option.
Use specified IP Address	Type the IP address of the host name(s). Use this if you have a static IP address.

Table 56 Dynamic DNS

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the NBG-460N.
Reset	Click **Reset** to begin configuring this screen afresh.